

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

OCT. 12, 1953

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on purpose!**



Official U. S. Navy photograph of the pilotless Regulus, landing after test flight

IN developing the pilotless Regulus, the Navy's new guided missile, Chance Vought called upon the Aviation Products Division of Goodyear for help in solving two tough problems.

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Next, a new-designed fuel cell of rubberized fabric was needed—one which could be actuated by an air-pressure diaphragm rather than the conventional fuel pump. Again, Goodyear delivered the goods.

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Domestic

Announcement was expected sometime last week of a program to convert existing CAA distance instrument equipment (DME) stations to newly developed military system. New system will enable both commercial and military planes to operate from the same ground stations. Plan worked out by Defense Department and CAA will see cost of owning and operating a military DME network but will slow airline adoption of DME by acquiring readouts of the present civil system.

Aircoach Transport Assn., in behalf of its 40 member airlines, offered to fly first-class and for 15¢ extra per ton-mile. Four scheduled airlines last week began an experimental all first-class mail service (see p. 20).

New air-ground communications have been tested successfully by Pan American World Airways on eight trans-Pacific flights. PAA's selective calling system (Selcall) eliminates constant radio monitoring by flight crews, one-to-two transports by transoceanic paths that use off a toll and light in cockpit

Fifteen years of 15 leading jet and rocket engine designers arrived in New York last week en route to Washington, D. C., conferences with U.S. military authorities and to meetings in Montreal with Canadian government and aircraft industry officials.

TYPE FIVE airplane has been approved for large Edo Model 3000 four-cylinder, allowable gross weight 1,530

Lightplane shipments by five major factors totaled 116 aircraft valued at more than \$1.9 million during August, dropping from the previous month's 169 units at \$1,287,000. Aircraft Industries Aza reports. The components Aero Design, Beech, Cessna, Piper and Telemaster.

Strategic Air Command will hold its annual bombing and navigation competition at Waller AFB, Russell, N. M., Oct. 27-31, flying B-47s, B-56s, B-29s and B-36s.

Newark (N. J.) Airport has reopened its East-West runway after completion of an \$88,000 improvement project that strengthened the 6,800 ft strip to handle aircraft weighing up to 150,000 lb. The closure will be decreased 11-29.

Ryan Side-by-Side Trainer

First flight photo of Ryan Aeronautical Company's new Model 73 military transport version of the Navion (see p. 24 for details)

Eyes has entered the place in a Navy competition. Double-type array would be standard in production model, company says.

National Association of Flying Farmers will hold its 1954 convention at Fresno, Calif., next June. California Aeronautics Commission predicts more than 1,500 delegates will attend the meeting, flying an estimated 500 planes.

of 54,697,107 during the nine months ended July 31

Northwest Orient Airways has declared a regular quarterly dividend of 33 1/2 cents per share on a 6% cumulative preference stock, payable Nov. 1 to stockholders of record Oct. 28.

International

Experimental turbine production: has been set up in the compressed gases jet Engine Co. The firm is working on a 1,000-hp thrust powerplant, will produce five engines of 5,000-hp thrust each in 1954-55.

Fokker Aircraft Co., Amsterdam, reports a net profit of approximately \$44,369 for 1952, compared with \$479 in 1951.

Sherr City Airways, Britain's cross-channel air ferry, made a net profit of \$32,263 last year, a decrease of \$43,375 from 1952.

Qatar Airways will merge with government-owned Pegasus International Airlines by April of next year, authorities at Kathifi report. The combined carrier will begin operations with three new Super Constellation plus Orion's current fleet of two Convair and 11 DC-3s.

Copenhagen's Kastrup Airport has started a \$2.9-million expansion, will be able to dispatch aircraft at a rate of two planes per minute when the project is completed.

Financial

Allegheny Airlines reports a net profit of \$42,790 for the fiscal year ended June 30, compared with a net loss of \$142,537 for fiscal 1992. Operating revenues increased \$167,624 to \$1,886,906, while mail payments were cut \$8,383.

Continental Motors Corp., Detroit, and its subsidiaries make all services.

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October 12, 1953

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ANGLgears are described fully in the L.A.S. Aeronautical Engineering Catalog. Refer to this publication for complete information, or write us direct.



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LONG-RANGE VICKERS VALIANT—Britain's design bomber flies with external fuel tanks, modified on the Mark 1 variant for the London Christmas Eve New Zealand air show before Valiant was withdrawn by the British Air Ministry from last week's 17,000-m. cruise.

Foreign Aviation News in Pictures



TWIN-ENGINE DORNIER DO 26—German light transport is an enlarged M.D. 102, has 100-hp engine, 100-hp engine in two French engines.



AIR FORCE DORNIER DO 26—German light transport is an enlarged M.D. 102, has 100-hp engine, 100-hp engine in two French engines.



INDUSTRY OBSERVER

► British sources say there is still some reluctance in fuel economy between the Rolls-Royce Conway bypass engine and the Bristol Olympus pure jet. Conway is reported to burn 0.73 lb of fuel/lb (thrust/lb) against 0.75 for Olympus. Thrust of the Conway is around 18,000 lb, if the same fuel flow were used in a pure jet instead of a bypass, the thrust would approach 18,000 lb.

► British troops have decided plans to build a *Britannia* 200 airlifter. On the basis of a survey of future trans-Atlantic cargo market, British Overseas Airways Corp. induced its option for three freighters from an air to sea ROAC probably would reverse the decision if it could prevent British air-aided nations from participating in trans-Atlantic cargo traffic, but the British independently appear to have a clear shot at this market.

► Navy has ordered the remainder of the Grumman F10F fighter unit testing for construction of 11 service test models. Original experimental XF10F which flew at Edwards AFB has been dismantled and shipped to the Naval Air Materiel Center at Johnsville, Pa., where it will be used as an engine test bed.

► United Air Lines is considering installing its commercial adaptation of military airborne radar in its new DC-7s. The CAL radar is currently being flight tested experimentally and is noted generally as smaller, cooler and less expensive of maintenance. (Aviation Week Sept. 25, p. 54). Estimated cost of the airborne radar installation in a DC-7 is \$30,000.

► General Electric has a military research contract to develop instrumentation for non-destructive inspection of skin-tension and strain in aerospace metal airplane fuselage. Glenn L. Martin Co. is investigating details of airborne headed strain of large tubular structural elements.

► Industry circles predict Trans World Airlines may make an attempt to compete with American Airlines' bid to offer the first regularly scheduled nonstop transcontinental airbus service—at least on outstation schedules. AA has announced inauguration of the service Nov. 24 with Douglas DC-7s now undergoing Civil CAA certification flight tests. If TWA makes the move, it could use Lockheed 1949 Super Constellation already in service for the nonstop jump.

► KLM Royal Dutch Airlines, first airline to put the Wright Turbo Compound piston engine into commercial service, generally is pleased with the new powerplant. KLM officials told Aviation Week's biggest problem to date has been cracking of turbine nozzle boxes, followed by cracking of turbine output caps. KLM has since Turbo Compound's that already have logged 350,493 hr in regular service.

► Aerojet Industries Ann. reports wide disagreement among its members on what the society organized guided missiles committee should actually do to develop a military industry-wide approach to the problem of improving guided missile reliability.

► CAA administrator Fred B. Lee has been told by the Aerojet Industries Ann. to study the possibility of allowing manufacturers to certificate their own light helicopters for use in commercial operations. CAA already has offered that option on CAR 7-type aircraft below 6,000 lb gross weight. Meanwhile, the Air Transport Assn. and AIA's aircraft manufacturers committee are working with Civil Aeronautics Board to develop transport category requirements for air carrier-type helicopters.

► British Midland Jet Supply has ordered Fokker Airborne Ltd. to build a prototype Rotodyne jet helicopter powered by two 3,000-hp Napier Elan turboprops.

► Bristol's Model H1 helicopter design calls for a two-engine, tandem rotor configuration with seating capacity for more than 60 passengers.

WHO'S WHERE

In the Front Office

► Guy W. Vaughs, senior chairman of Chance Vought Corp. and Wright Aircraft, has been elected a director of John Chamberlain & Sons, New York.

► Thomas W. A. Robinson, assistant director and general manager of Vickers Armstrong's aircraft division, has joined the board of Flight Industries, Inc., London, England. Wing Cmdr. H. C. Johnson has resigned the company as special representative for its planning and development of new fields.

► Walter G. Thompson is new executive vice president of Transpac Co., Torrance, Cal. Ray B. Nichols has become vice president/airline operations in the aircraft department firm's South Bend subsidiary, Transpac Co. of Indiana. Rodney T. Dunlap, vice president general manager; John A. Tuck, assistant general manager; and Walter Hudson, chief engineer.

► William Paul Young has been appointed vice president/sales of Aerojet Supply, Norwalk, Conn.

Changes

► R. G. Finner has been promoted to general manager of Douglas Aircraft Co.'s Long Beach (Calif.) Division.

► Air Vice Marshal Frank Long (RAF Ret.) has joined de Havilland Propellers Ltd., Hatfield, England, as senior sales officer.

► Leonard D. Barkman is new chief engineer of Fletcher Aviation Corp., Pasadena, Calif.

► Carl E. Schenckman has been named chief engineer of Thompson Products' Electronics Division, Cleveland. James L. White is new senior project engineer at the Columbus, Ohio, aircraft research laboratory.

► D. H. Schmitt has been named senior engineer in charge of the gas turbine engine group at Continental Aviation & Engineering Corp., Detroit.

► Tom E. McCone, former general manager of Aero Controls Co. of Tulsa, Okla., has joined the Allison Division of General Motors Corp., Indianapolis, as assistant director of engineering.

► J. H. Christensen has become assistant to the general manager of Bendix Aviation's Pacific Division, North Hollywood, Calif.

► R. P. Gilchrist is new manager of national air carriers' fleet design division, Paul G. Gilson has been promoted to factory manager of Plant 1.

► Carl A. Kelley has been appointed manager of Northrup Aircraft's cost accounting department, Hawthorne, Calif.

Honors and Elections

► Thomas E. Russell, president of Bristol International Airways, has been appointed general chairman of Southwestern Work to be observed Feb. 21-22 under sponsorship of the National Conference of Christian and Jews.

► Delos W. Rosend, president of Aero Transport, Oklahoma City, has been elected a member of the National Business Aircraft Assn., Washington, D. C.

CUTEANS ABOARD A CARRIER AT SEA

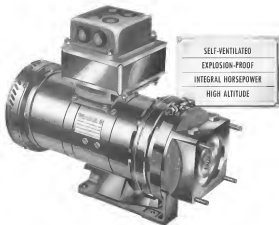
"In the Groove"

The Navy's new supersonic two-seat F7U-1 fighter, designed to be a top performer, number of America's Air Force, took its place in land during carrier evaluation trials.



Chance Vought Aircraft

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION



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More power per pound through new ventilation techniques

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These motors cover a range from 1½ to 5 horsepower and weigh from 18 to 42 pounds including accessories. Motors are available with standard AND pads or with special mountings. Radio noise filters and gear reductions are optional. These motors meet the explosion-proof and environmental requirements contained in military specifications.

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Washington Roundup

Spanish Bases

The Spanish air bases, finally secured by the U S after three years of diplomatic jockeying, are no longer as important as they were when negotiations for them were begun in 1950. Hence, Spain now has a fleet of jet bombers capable of attacking the Spanish air bases from airfields in East Germany. It is doubtful if any significant amount of U S air power will use the Spanish bases in the face of the threat Strategic Air Command will continue to count on in North African bases, which still are out of range of the Russian B-25 jet bombers.

Refueling Problem

Gen. Curtis E. LeMay, commander of the Strategic Air Command, told a recent USAF commanders' conference in Washington that he is seriously unhappy over SAC's current dependence on aerial refueling to accomplish its long-range mission with jet bombers. LeMay is strongly interested in development of an intercontinental jet bomber that can do the job of atomic bombs delivery without aerial refueling.

General Cook's Role

Top-level Pentagon briefing of USAF staff on the new role of Gen. Curtis Cook is overall military role, with authority over Air Material Command and Air Research and Development Command, indicates his position will be even more dominant than suggested by signal in statement by USAF Secretary Harold Falkner (Aviation Week Oct. 5, p. 11). Gen. Cook will have veto power on all USAF research and development projects, although these major administrations will be handled by Lt. Gen. Laurier Cooper who is now subordinate to Gen. Cook.

Farley's Return

James Farley, who as Postmaster General fought a long, hot losing battle against setting up a system of certificates of convenience and necessity for its operations in the mid-40s, is back in Washington as a member of the House Transportation subcommittee which will have much to say about the future regulation of air transportation. Farley's most important of the Post Office should have authority to determine mail routes and schedules.

Shrink Washington?

Two commissions that will lay down the overall policies into which the specific recommendations of the Administration's survey are written under Undersecretary of Commerce Robert Murray will be filed are now reaching their leg.

Commission on Intergovernmental Relations, composed with getting the federal government out of fields that ought to be taken over by states and cities. The law which created the 25-member commission, headed by Clarence Meehan, former dean of Notre Dame Law School, pointed to its necessity because "the federal government has been extended into many fields which under our constitutional system, may be the primary

interest and obligation of the several states and their subdivisions."

The commission's report, which will govern Administration policy on such issues as federal surveys operations and federal airport aid is due Mar. 1.

Commission on Governmental Operations, directed to consolidate and simplify federal activities "not necessary to the efficient conduct of government." Recommendations of the commission, headed by former President Herbert Hoover, probably will be forthcoming shortly after the reorganization of Congress in January. Final report isn't due until November 1954.

Impromptu remarks by Hoover point to abolition of Civil Aeronautics Board. His observation: "There are 75 or 80 independent agencies. If the President gave one hour a week to each of them, that would mean he was spending 75 or 80 hours a week on a task that requires constant effort doing nothing else. No one knows after them but the budget director." The way "to get them out of the President's hair." Hoover suggested consolidate them into the government departments.

Members of Michigan's Sen. Homer Ferguson, a member of the transportation and surface of the last sitting it up, but at a major headquarters of two staff members of CAB and CAA. He proposed that all jobs paying more than \$4,200 a year actually were "policy making" and should be taken out of Civil Service jurisdiction and turned over to Administration supporters.

MATS Reorganization

Reorganization of Military Air Transport Service as a separate entity operating in a revolving fund, after the pattern of Military Sea Transport Service, is being pushed.

"When reorganization has to account and the customer has to pay, it sparks the incentive motive for economy and efficiency," USAF's Assistant Secretary II, Lee White comments. This reflects a sharp change in USAF policy which long has treated effects along this line as the ground that MATS is a business operation.

With an actual capitalization from Air Force funds, MATS would be self-sustaining, changing "casualties"—Army, Navy, USAF—for services. Col. J. J. Norwood, under the Deputy Chief of Staff for Operations, is the project officer drawing up plans for the change in MATS.

AAR vs. Airmail

Association of American Railroads is hitting industry at Post Office's New York-Chicago and Washington-Chicago experiment in shipping surface mail by air. Comparably, AAR is going to the express department of all that class mail be an air-mailed—position which would be interpreted as standing in the way of progress.

Instead, the association is emphasizing the high cost of airmail to the government and taxpayer. AAR's president, William Farley, observed: "On certain heavy freight loads, the railroads are moving mail for as little as 11 cents per ton-mile. It has been further estimated that if placed in airmail mail cars, 10,000 loads of mail can be hauled across the continent for as little as 5 cents a ton-mile." The rail set by the Post Office for the experiment is in transport of surface mail 18 to 20 cents a ton-mile.

—Washington Staff



PLANFORM OF SKYRAY'S modified delta-wing design is shown clearly in these two aerial photos made during recent speed trials.

753.4 Mph.

- Prototype F4D shatters world's speed record.

- Batwing Skyray's top mark hits Mach .96

By William J. Connelley

Salina Sea, Calif.—Navy Lt. Cmdr James B. Vossler returned the world's speed record to the U.S. Oct. 3 when he streaked his Douglas F4D Skyray over a recurrent course on the shore of this inland sea at an average speed of 753.4 mph.

He flew seven of the eight right-hand laps of the 737.5 mph. at the Mike Lithgow in a Supermarine Swift on the Lymington coast.

• **Mach .96**—Vossler's notes were 746.073, 761.44, 746.313 and 759.489, National Aeronautics Assoc. officials report.

Temperature of 88.5 deg. put the speed of sound in the neighborhood of 762 mph., indicating his top Mach number hit .96.

The eight-second Navy aircraft turned out by Douglas Aircraft's Ed Boushman and his team of 51 Seguros engineers thus became the first carrier-based plane to beat the world's speed mark.

Earlier attempts by Vossler to surpass the British mark had been plagued by wind-tunnel and mechanical troubles (Avenue Wings Oct. 5, p. 16). But the 15-year-old Navy jet pilot said the Skyray functioned perfectly on his record-shattering flight.

• **20,000-Lb. Takeoff**—The Skyray was loaded with some 780 gal. of pre-cooled



SKYRAY SKIPPER JAMES VOSSLER: The achievement was like a kick in the pants when it bounced on 39 seconds before each lap.

fuel at the El Centro Naval Auxiliary Air Station, 40 mi. southeast of the Salina Sea coast.

Weight of the aircraft—which has a wingspan of 33 1/2 ft.—and a length of 30 ft.—was 20,000 lb. at takeoff.

It burned some 3,450 lb. of fuel, using approximately 575 gal. on the 20-min. speed run.

• **Prototype Skyray**—The F4D flew as the speed run is not a production model. It is the second of two prototypes of the batwing aircraft built for the Navy by Douglas.

The Skyray in which Vossler set his record was powered by a Westinghouse XJ40 WE-8 engine, developing 11,600 lb. thrust with afterburner.

The first prototype is now at Patuxent River, Md., for career qualification trials.

Production models of the F4D, seen to come off assembly lines at Douglas El Segundo, will be equipped with F4W/WA jet engines that will take up 15,000 lb.

F-100: 758 Mph.

North American Aviation laid out work on its first attempt to return the world's speed record to the Air Force when the F-100 left the shop of the Navy's Douglas F4D mark.

Lt. Col. Peter Koenig set the new supersonic benchmark over the same Salina Sea course where Lt. Cmdr James Vossler set the record with the Skyray. Although its 357 turbojet pushed the F-100 up to 758 mph. on the try last Monday, it did not top the Navy mark by the required 1% on its four laps.

Temperature for the speed run was 97.62°, slightly less favorable than when Vossler set the record in the Skyray.

At mid-work NAA was planning another record attempt.

thrust with the use of an afterburner. • **Afterburner Kicks**—After his final pass Vossler hooked back on the stick and streaked upward out of sight in a white-flicking cloud of triumph. It was apparent the Navy pilot was certain he had shattered the British mark, a feat he had failed to accomplish a week earlier.

He and later a cameraman that set up a slightly head-on shot for the course broke into easy smiles.

"I missed the afterburner on about 30 seconds before entering the course on each pass and I could feel it like a kick in the pants when it bounced on," he commented.

Aircraft Inventories Total \$2.4 Million

Aircraft and parts manufacturers nearly quadrupled their inventories in 1952 and spent close to eight times as much money on new plants and equipment as they did in 1947, an advance report on the Census Bureau's 1952 survey shows.

The industry's inventory totaled \$2,403,145,000 at the end of 1952. Of the total, manufacturers had \$1,319,800,000 in finished products and \$2,250,777,000 in materials, supplies and work in process.

In 1951, the total inventory figure was \$1,690,650,000 of which \$82,861,800 was in finished products and \$1,547,315,000 in materials, supplies and work in process.

At the end of 1947, the total was \$68,171,600, representing \$38,732,000 in finished products and \$30,439,600 in materials, supplies and work in process.

Aircraft manufacturers made a total investment of \$395,155,000 in new plants and new equipment last year. New buildings and plant additions accounted for \$125,236,000 and \$77,939,000 for new machinery and equipment.

During 1951, the aircraft industry spent \$15,519,100 on its own development, amounting \$13,315,000 in new structures and plant additions and \$19,717,000 in new equipment and machinery.

The industry invested \$15,867,000 in 1947. Of this amount \$10,616,000 was for new buildings and the remaining \$5,251,000 was spent for new air delivery and equipment.

F4D Picture

If you cut 5 cups of American Wine had a picture of the McDonnell F4D (see p. 16 of this issue) accompanying the Douglas F4D speed record story, finger at several blunders which could have been avoided before the publicity error was corrected.

Global Airlines

- IATA sets course for higher traffic volume.
- Group urges governments to keep hands-off policy.

By Lee Moore

Montreal—International Air Transport Assn. last week set a course aimed at ridding the globe with an ever-increasing number of passenger and cargo planes crossing national boundaries freely.

IATA Director General Sir Wilfrid Hinde, in opening the ninth annual general meeting of airline executives, said the world's air routes this year will carry some 750 million passengers, an increase of about 5 million over 1951.

IATA Foes—The association is the world's air professionals, more efficient than most governments because it negotiates a better exchange-rate pool for its members through increased revenue in lower fares.

What the association at this session said more than anything else is government hands off the global market economy balance its two to three years while the current situation tries to make good on new low-cost carrier expansion.

Sir Wilfrid told American Wings that low fares meant cost volume enough to increase profit. It will be a success both for business and the public, he said, if governments will restrain themselves from interfering their own powers at IATA conferences and from laying more taxes and fees on airlines and their development.

• **Mostly Assembly—Chief executives of most of the world's international airlines gathered here for the ninth 11 in their annual assembly in an exchange based since after a year's technical and economic backing and spade-work by committees and central working groups.**

Purpose of this meeting is to lay out resolutions to unify companies and development progress hatched during the working year.

At mid-week, most of the IATA program for this assembly had been tried up in executive sessions.

The annual assembly, with all member airlines' airlines casting one vote only on each resolution, is the basic source of authority for IATA. Membership is open to all airlines certified by United Nations governments. In eight years, it has accomplished these things to successful effect as trans-

port development and traffic volume that most governments or individuals never might have done alone.

• **Cost cuts** on per seat-mile and passenger mile steadily, despite rising cost of labor and maintenance.

• **Cost passenger** down as much as 50%, and established at IATA traffic conferences some 30,000 international rate schedules that are seasonally revised.

• **Standardized technical developments** and technology of nearly 70 nations' aircraft and airways.

• **Provided a single world currency** for all travel through international airways—no exchange charges.

• **Cost airlines** and insurance companies and other related industries.

• **Approved trade quotas** and other quantitative restrictions that might limit existing on national capacity.

• **Through hundreds of bilateral international government agreements** accomplished through joint efforts by IATA, national health and safety laws, international restrictions on flight capacity and frequency. These are eventually a single agreement, but right now the emphasis is on building the laws against the strict trend of most nations to hedge on their behalf.

• **Prevented international air war.** By facing nearly all international air war, IATA has forestalled the suspension of flights of a nation against parties by oversteering its airway so much that it could offer below-cost fares and was all competition and/or possible price war.

• **IATA Follower**—IATA has two main functions: to coordinate and negotiate with governments and the private aviation industry, which are confined in some countries by the resultant weakness of national governments and the private aviation industry, which are confined in some countries by the resultant weakness of national governments and the private aviation industry.

All IATA air agreements, on 10,000 miles, have secured maximum approval of the governments concerned. Less than 5% of these agreements have been vetoed by governments at various times in the past.

The requirement of unanimous airline and government approval is IATA's strength and its weakness. Without it, world air transport, now as uncontrolled by the passenger as other industries (except for airlines and transportation and type), would be in restricted in international commodity agreements.

Weakness of the IATA's requirement of unanimity is, of course, that one bad or mischievous airline or government can occasion havoc. However, the mutual profit incentive to IATA members has prevented this far better than could the United Nations or a similar body.

Wilson Debunks H-Bomb Threat

Defense chief says Russia lacks aircraft capable of delivering successful attacks against U. S.

The Russian war has aircraft capable of delivering hydrogen bombs at targets against the United States, as much they want them, Defense Secretary Charles E. Wilson cautioned in a Pentagon press conference last week.

When he did not believe the Soviet Union has either the aircraft or the bombs required for this type of assault, he said.

The Defense Secretary disagreed with estimates of Gordon Dean, former chairman of the Atomic Energy Commission and Arthur C. Fleming, head of the Office of Defense Mobilization, that Russia would have this capability some time in the future on the ground that his own information was more factual and technical, thus reports available to other people.

Reason to Worry? "We give the Russians credit for having aircraft that they just don't have," Wilson said. "Russia couldn't give a successful war weapon through a successful war, and that's the only reason I don't see the possibility of productive capacity and scientific skill as still in the five world and not in Communist territory."

We saw have a strong military problem. I see the Russians looking at it, I think, I would like even reason to be worried. We want credit for the ability of Russian military strength but we don't start a war unless they have good reason to think they can win. If we can demonstrate that they will face sufficient opposition, they won't do it."

Impaired Defense. Wilson revealed that the Defense Department is having difficulty with Canada in integrating U. S. and Canadian parts of each war unit into a single conventional defense system.

Assistant Defense Secretary Donald Quarles, in charge of research and development, said research and planning for a common defense system has not reached a point where decisions could be made on how much and what kind of equipment would be required.

He estimated that an additional \$500 million to \$1 billion in all that would be required to be involved in improved defense during the next year.

Wilson said the Defense Department was opposed to complete reliance on air as defense system and firmly was committed to maintenance of strong military forces as the best means of preventing a Russian or other attack.

Norwegian Foundation. The defense

chief revealed his earlier testimony before Congress that basic research had no place in his department to emphasize that it was a necessary foundation for a military development program and to offer assurance that he actually had taken no steps to de-emphasize basic research.

He said he had been concerned about reducing the overlaid costs of research in educational institutions and noting that the study be spent on actual research work rather than the salary of the scientists.

6-10 Position. In answer, he said he was positive on military research and development. Wilson said: "The research and development program of the Department of Defense is fundamental in achieving and maintaining a reasonable posture of defense for the nation."

Technology, through providing us with superior weapons and the knowledge to use them, offers the most possible greater numerical superiority of a potential enemy and goes as a

major force against us in the world. The Department of Defense has and must continue to have an effective research and development program.

"We must keep our weapons systems ahead of all potential enemies in time of peace, with the hope that through being prepared we will deter a possible war."

"The mutual between the act of aggression and destruction is so short that we cannot afford to delay our development of new weapons until an enemy strikes. We must recognize that the weapons required to repel aggression cannot be and are not conserved and developed, except in the most costly and slow to perfect and to test and to use. We must recognize that the weapons and counter weapons which we are depending upon to ensure our own safety."

Weapons Representation. "The Department of Defense at its present spending more money on research and development than it has at any time before in history. Actual expenditures for research that year will be about \$1.5 billion and we had approximately 5,000 specific research projects financed in three funds. This is approximately the same as the amount of money appropriated by Congress for research and development for fiscal 1951."

"During the last year, 1947-48-49-50, the amount spent averaged about \$400 million per year, so we are currently spending about 12 times the money for research and development that we did before the Korean war."

"Perhaps we are currently spending a little more than the minimum as measured in an effort to make up for the lack of expenditures in previous years."

B-36 Global Training

Strategic Air Command sent a 13 member squadron of B-36s to North Africa last week, while another squadron prepared for a flight this week, to Thule, Greenland.

A squadron of the Seventh Bombardment Wing, based at Grangeville, AFB, Tex., will train about 11 days in North Africa. The Thule-based squadron from the Sixth Bombardment Wing is based at Walker AFB, Roswell, N. M.

Both wings are part of SAC's global training program which divides bomb squadrons to different bases quickly and provides operational training overseas.

500th Copier

After Helicopters had delivered its 500th production model, an H-19B to Army from its Palo Alto, Calif., plant, Bell Helicopter Corp. has announced that it will have been built in the past year. The company has been building H-19s for the Army and military and civilian agencies.

Engineers Plot Economy Course

Better planning, better coordination are two paths to more air power per dollar, SAE forum holds.

Los Angeles-based, the present economy have led the nations' aircraft services. U. S. military men have been struggling with the question of how to get more air power per dollar.

They got an idea this month when aircraft industry engineers, gathered here for the National Aeronautics Meeting of the Society of Automotive Engineers, tackled the same problem.

The story on the subject for the conference was "The way to better aircraft for the future."

Two Answers—Engineers at the two-day Aircraft Production Forum, which opened SAE's technical sessions, came up with two answers.

Better preproduction planning. **Closer coordination** between department of each plant.

These two solutions to developing more power per dollar, stated by the latest production, testing, quality control, materials handling, maintenance, cost, scheduling, financing and change control.

Industry Spending—Scientists on have the report dollars to save dollars eliminated at least one group.

"Quality control has often been on the edge of the line when it comes to passing out the money," concluded one quality control engineer. "Always planning and spending is necessary. We had to prevent a situation where a 'skipped machine' from not put the brakes in his response to the test, instead being caught in work as it finally."

To avoid this, the economic good, discipline and quality control engineers should select the important inspection points so they can prepare the final inspection.

More precision should be put in management to design and manufacture, on production line improvements, a high production team, the quality control group concluded.

Practical Approach—In process expert time versus and expense, cost per lot, heeded debate.

In process type of inspection is a very definite must," pointed G. A. Conner, Conner's quality control manager. "We cannot have an airplane, apart at the end of the line—No other approach is practical."

But E. S. Bushnell of SAE Aircraft Co. pointed out that in process inspection is wasteful in some cases. Final inspection can do the job. Bushnell cited an instance where SAE discovered a process inspection was not reducing failures by a sufficient margin. The inspection was costing more than it saved.

SAE dropped the inspection inspection.

Two steps in education of product line workers and checked final inspection as alternative solution.

"Final inspection is protection for the customer," a process inspection is protection for the manufacturer, and today's quality control manager.

The panel agreed the answer depended on the complexity of the item in question, whether it was a complete assembly or component.

Preplanning is the important thing, outlined J. H. Smith of SAE's Office of Northern Aircraft in the "You can inspect what you know, inspection is needed. This saving money and turning out more planes per dollar."

How to Quantify—Question of a new standard for inspection also brought new question.

"You cannot set a true standard for inspection in the aircraft industry," argued Conner's Conner. "Inspection lines are directly proportional to the quality of the product."

Bushnell stated that with the present situation for variables, quite a few operations could be set on true standard although this might appear to be off the line, almost in the event of poor inspection prediction.

A. D. Hall, director of quality control at Hughes Aircraft, offered an even more radical opinion. "Not only can you get inspection on true standard," he said, "but you can get a better inspection."

The report on inspection, a process group to double check, the situation he identified, but cited Western Electric and General Electric, as firms that have quality.

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SAE dropped the inspection inspection.

has found this method inferior. I don't know what is so positive about the surface, because that same thing the machine is used," he concluded.

Washable Coatings—Another unusual suggestion came out of the materials handling session. Perhaps the careful treatment of delicate parts is necessary increasing the cost of handling.

"We have noted some down the drain on pick-ups too obviously," said an engineer. "He reported his own plan to wash parts in a tank and then use a brush to clean them."

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MORE POWER FOR TWIN NAAM

Items last week delivered to the Air Force from North American included 100 hp engines, a new cooling system for large propellers.

engines and improved method to reduce engine noise. Price: \$28,500. Turbo: 100 hp. Price: \$14,000. Engines.

may change after the start of production.

"I don't know who can tell us how many changes there should be in an airplane," said Morris Hapner, supervisor of cost analysis and standards at Douglas El Segundo, "but I am sure of one thing—there are too many changes."

Schlesinger's Coahoma-Pittsboro decision brought out increasing concern on the part of subcontractors as to their place in the air power program.

"We are receiving increasing turn back of equipment and parts from subcontractors and vendors as to their place in the program," said Eric Cox K. D. Metzger, chief of the Production and Business Division of the Air Materials Command.

Metzger indicated his belief that short-term subcontractors may be costing USAF money as well as upsetting the subcontractors.

Lower per unit costs would result in greater economy if prime contractors would place subcontractors for the same duration as the prime contract, he said. The Air Force is very concerned with the cost penalty of air placing contract orders.

A representative of Convair, holder of the first air weapon system contract, commented that his company is placing subcontractors for the entire forward commitment of the prime contract.

Another warning to industry on local means came from General Metzger. "We are concerned with the need to reduce manufacturing lead time. I think the Secretary of Defense has made himself clear—and faces with which we are confronted today are as many cases unmet and have a bad effect on the budget."

He also clearly indicated preliminary design engineers work with leading engineers? Where should the line of responsibility be drawn? These questions come up in the leading engineers.

Lead-Engineers Path—Some firms strongly emphasize such cooperation, while others take a more adversarial attitude.

G. A. Texas, holding manager of the Great E. Martin Co., pointed out that leading is of prime concern as cost. Therefore, he felt, the leading engineers should make it clear that the design engineers want his ideas out.

At the Martin plant, said Texas, leading engineers work right in the engineering department. Douglas El Segundo and Convair, among others, also follow this policy.

Others felt restrictions of designing in leading engineers should be avoided, that such cooperation should consist not of showing the design engineers which of two decisions is the best exposure. Most panel members agreed responsibility must rest with the design engineers.

Future Design—At the close of the Aircraft Production Forum, the SAE engineers opened technical sessions devoted to the best design, production and operation of aircraft flying approximately at 70,000 ft in extremes of heat and cold.

A paper delivered by Lockheed Aircraft Corp.'s Clarence L. (Kirk) Johnson seemed destined to become the most controversial. In it, Johnson defended the straight wing for supersonic flight and attacked some of the pet theories of delta-wing advocates.

The SAE's Manly Memorial Award went to Robert E. Goetz and Bruce E. Miller of Pratt & Whitney for a paper on "Investigation for Aircraft Gas Turbine Development," delivered at the society's annual meeting in January 1972.

First Bulk Airmail Flights Take Off

First-class, three-seat mail took to the air for the first time simultaneously in Washington, New York and Chicago last week.

Postmaster General Arthur Sommerfeld, official of the experiment to send mail by air for the first time simultaneously in Washington, New York and Chicago last week.

In brief, pre-takeoff ceremonies at Washington National Airport, Andrews Airfield DC-6 Flight 269 became the first airmail to carry regular mail out of Washington.

Business representing American, United, Capital and Trans World Airlines came to discuss in what order

the airlines would carry the mail after that first trip.

As was followed by Capital, TWA and UAL. They shared 2 million Chicago-based letters. The experiment will be carried out for a year with a limited volume of first-class mail flown on Washington-Chicago and New York-Chicago routes.

Last week's flights took off slightly more than 43 years after Charles Hamilton flew the first airmail, consisting of three official messages, from New York to Philadelphia, June 15, 1930.

CAB Freezes 75% Coach Fare Ceiling

Certificated domestic airlines fares will continue indefinitely no higher than those now in effect, Civil Aeronautics Board said last week in its new coach policy statement.

CAB overhauled current coach ceilings of not more than 75% of the corresponding first-class tariff, eliminating the 75% differential in the maximum cost differential between flight services.

New Scale—Tourist fares no longer will carry specific expiration dates, and special coach seats will not be required after Jan. 18, 1974. Current rates are scheduled to expire Dec. 31.

New fares will not be subject to specific coach-per-mile ceilings under the new policy. Present ceilings are low-and-high rates for high-distant tourist transport during normal travel hours, low rates for any plane operating night coach service.

Refund Policy—The Board signs contracts to consider sleeping, a policy of refunding when flights are canceled when operational situations require airlines to use a high-density aircraft on a first-class schedule when there is an applicable coach tariff. Where there is none, CAB suggests a 25% refund.

Any new coach services or extensions of existing coach flights, the Board says, should limit hours of departure to off-peak periods and keep maximum density to a maximum for safe carrying capacity.

Maximum seating densities for coach seats used in tourist service should be DC-4, 64, DC-6, 72; DC-68, 76; Constellation, 79; Super Constellation, 85.

Assembly Line Brain

Los Angeles—Rena Woodstock Corp. has announced a \$170,000 contract from Thompson Products, Inc. for development of electronic techniques for automatically planning and controlling the purchase, storage and flow of raw materials and parts of modern factory assembly lines.



PRINCE HENRIOT CORP. uses 45 Timken bearings in transmissions, pitch bearing cases and landing wheels.

TIMKEN® bearings help "flying lifeboats" rescue 16 from stranded ship

AFTER the supply freighter Greenbelt Roster crashed on rocks and split in half last December off Laguna, Italy, four Navy BUPA's Prince Henriot picked up 16 survivors and carried them to safety.

45 Timken® tapered roller bearings in each helicopter's free and driven main rotor bearings, pitch bearing cases and landing wheels gave the dependability needed—whether it's a routine flight or a rescue mission. The tapered construction of Timken bearings carries radial and thrust loads in one line.

No other bearing gives you all the advantages you get with Timken tapered roller bearings. Be sure to specify them for the equipment you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton, Ohio, Canadian plant St. Thomas, Ontario. Cable address: "TIMKOSCO".



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Pilot Visibility

- Collision hearing studies blind airliner cockpits.
- Aviation authorities offer many possible solutions.

Transport cockpit visibility problems dominated Chicago hearings on the recent mid-air collision of American and United Air Lines aircraft at 11,000 ft. above Michigan City, Ind.

Testimony at the Civil Aeronautics Board hearings, heavily attended by industry spokesmen, failed to produce any simple solution to the growing problem of crowded airspace.

But several possible developments emerged. A few of the possibilities mentioned at and around the hearing by industry and government spokesmen were:

- **Flatter windows** of high tensile-strength being installed by some airlines, including American and United.
- **Many windows could be cut** in Conquest and other transport types, a company spokesman indicated. The modification would be expensive.
- **Periscope mirror installations** were discussed by some, scoffed at by others.
- **Flight dispatch coordination** may help, to reduce the odds of mid-air collisions. However, most observers agreed such plans must be developed carefully and may not be practical.
- **Blind Cockpit-Crews** of some cockpits visibility systems by Civil Aeronautics Administration national development plans to be equal to or better than most other civil aviation designs.

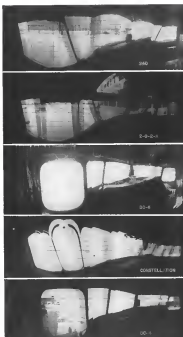
Pilots of both aircraft testified that their view on the short last night was the other plane (American World Sept. 7, p. 77). Some passengers did see the planes converging and three said they found collisions.

Transport cockpit windows are blind except for a wide, shallow cone of vision ahead. Top, of windows above, below and behind the pilots covers part of this "Wing and engine window" cut down much of the forward vision obtainable from the side windows that do exist.

► **The Accident**—The American and UAL Conquest left Chicago one minute apart just before dark Aug. 26. They were dispatched under night flight rules, American to Detroit and United to Cleveland. Both close the last altitude, 11,000 ft.

Without seeing each other, they later converged while cruising on the same level at about 11,000 ft.

It was dark at that altitude and time. The UAL plane was slightly behind and to the side, passenger testimony indicated. It landed under the AA



COMPASSION of pilot visibility from five airlines. U.S. Airlines transport are equipped by a CAI-developed diverting camera.

Conquest. Its pass posted the American transport's hearing.

The American jump took a hole in cockpit roof above UAL cockpit.

Both planes reflected explosive debris patterns.

With its radio out, the UAL, three

placed at several eye level from the cockpit's seat. Scale is degree of angle visibility at the same at each of the five photos.

port route at emergency landing at South Bend, Ind., and the American plane returned to Chicago. There was no injury or further incident.

► **Flights**—Many conclusions as analyzed by official observers at the hearing.

► **Flights** of both planes maintained that

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SCHWEIZER AIRCRAFT CORP.
ELMBURG, NEW YORK

Report News, the company revealed here last week.

Designated Basic Model 72 military trainer, the plane features side-by-side seating for instructor and student. Ryan believes this arrangement offers great advantages over conventional line-and-aft seating.

► **Stronger Structure**—Extensive modifications of one of the company's Nomads was undertaken to comply with Navy requirements. The Model 72 made its first flight Sept. 5.

Structural strengthening for military acrobatics and additional fuel capacity increased gross weight of the Nomad. To compensate for this, two feet were added to each wingtip and the wing was rebuilt for added strength.

► **Changes**—The military-style cockpit has rock controls in place of the wheels as other Nomad models. Auxiliary controls were changed to a pedestal arrangement. The Model 72 has conventional saddle pedals. Flight characteristics in a stall are markedly different, company officials told Aviation Week.

Other changes include:

- Constant speed propeller instead of controllable pitch.
- Addition of four windows to cockpit enclosure and use of flush-mounted windows on canopy.
- Head bucket replaced by toe brakes.
- Elimination of nose wheel steering.
- Addition of roller trim tabs.
- More powerful radio equipment.
- Double rear seat replaced by baggage compartment.
- Former baggage compartment converted to equipment bay.

Ryan is completing the conversion final side-by-side seating with an installed hoodlet that will be distributed among personnel concerned with the production task.

Project requires use of the Model 72 in Doc Williams.

First B-37 Squadron To Form This Year

(McGraw-Hill World News)

London—Glen L. Martin Co. is producing the first USAF squadron of B-37 (Photo-reconnaissance version of the British Canberra) to be formed by year's end, with first groups in Europe early next year.

The B-37B, eight intruder version of the Canberra, will not be ready before "late next year," says Martin spokesman.

The Americans used the B-37 weight about 4,500 lb. more than the British Canberra. More equipment and heavy engines account for most of the difference.

The B-37B night intruder will have

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We congratulate **DOUGLAS** Aircraft Company, Inc., for their production of the DC-7. America's newest conventional transport.

VOI-SHAN Manufacturing Company, Inc., having supplied many standard and special design features used in the production of the complete Douglas DC series, is proud to share in this achievement.



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Engine Pneumatic Systems	X	X	
General & Specialty Control Systems			X
60 & 100 Motors	X	X	X
Good Exhaust Turbine Motors	X	X	X
Pressure Transducer (Electrically or Mechanically)	X	X	
Adaptability (Electrically or Mechanically)	X	X	X
Automatic Control Systems	X	X	

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an almost cockpit housing a two man crew in tandem, instead of the British three man crew with one seated off to the flanks.

J. Bellis, Martin's chief of sales development, and Jim Switzer, company chief sales manager, visited English Electric Co. here to sell the British of the handling over of the first B-57 to USAF (Aviation Week, Aug. 11, p. 17). English Electric developed the Canberra.

Bellis hinted Martin might drop Keros Metal Products as a prime subcontractor on B-57 wings. "We are on the verge of buying the wings back because they (Keros) haven't held up their end of the job."

Bellis and Switzer paid high tribute to the British company. "We can't say too much for the handling characteristics of the airplane."

After a visit to English Electric's Preston, Lancashire, production plant, Switzer added a new tribute to British production. "The U. S. is supposed to be ahead on jigs and tools, but Preston with few exceptions, has matched just as much looking as we have."

English Electric has delivered more than 500 Canberras to the RAF.

The visitors also let this be known:

- Martin expects to get the first 50 to 100 J65 engines for its B-57 from Brazil, later engines from Canada-Wright.
- English Electric's test pilots "Doc" Bennett and B. O. Heath are in Baltimore now testing out the B-57.

RCAC Base Program Costs \$400 Million

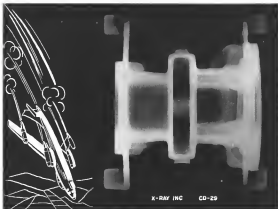
Toronto-Royal Canadian Air Force will complete a \$400 million expansion of airports, housing bases and garrisons, stages by the end of next year, according to an official estimate.

The construction program involves an extension of airports at permanent RCAC bases and re-activated World War II training stations to meet needs of military jet and heavy transport.

All civil service fields across the country, towns also are being lengthened and facilities improved for regular and emergency operations of RCAC.

- The program also includes:
- Large overhead hangars that can be expanded to house big planes of the future are under construction at a cost of approximately \$4 million.
- Two control and repair bases, each covering nearly 20 acres, are being built at suburbs of Toronto and Edmonton.

• Radar stations are being constructed across the nation requiring construction of roads, power stations, transmission lines and water systems in previously isolated back country.



PICTURE OF A FRUSTRATED KILLER!

This innocent-looking casing is a potential death dealing monster. It's a vital unit for one of America's giant Atomic Bombers. Every single one of these particular parts is x-rayed by us to make absolutely certain that there are no structural defects hidden beneath its surface. For if, while in flight, this part should fail, it could destroy a \$10,000,000 plane, its crew and mission. The role we play in eliminating this possibility not only saves lives and planes but

it also ends the costly process of machining scrap parts—which is a problem you may have—and one that we can certainly help you with. Write us today for full details on how our method of quality control involving radiography, spectrography, chemistry and metallography can help you cut manufacturing costs. We are also equipped to do radium and cobalt field testing of pressure vessels anywhere desired.

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PRODUCTION MODEL F-101A Phantom, Navy's new intercept jet fighter, soon will replace F-105B Thunder on McDonnell assembly line.

McDonnell Phasing In F3H, F-101 Jets



MUFFLING CHAMBER, exhaust system of XF-101's twin jets during engine tests.



FINAL VERSIONS of the F-101A, to be phased out this fall, roll down production line.

- Plant expands to meet record volume peaks.
- President forecasts high level output through '56.

McDonnell Aircraft Corp. reports the highest volume of sales and net profit in its 14-year history for the fiscal year ended June 30.

President James S. McDonnell, Jr., forecasts continued operations at the fiscal 1957 level for the next three years, an outlook based largely on production of the F-3H Phantom for the Navy and F-101 Voodoo for USAF.

Net income of \$4,234 million was reported for 1955, representing a 5,17% return on investment. This is below the 4% return averaged by McDonnell during its 14 years of operation and less than last the 1950 mix of 7.25%.

► **Talented Sales**—McDonnell's sales have more than tripled during the past Korean expansion, rising from \$38 million in 1945 to \$137 million for 1955.

Bookings increased approximately eight times, from \$61 million in 1950 to \$495.9 million at the end of fiscal 1955.

Employment at the St. Louis factory tripled from 5,600 persons in 1950 to more than 15,000 in 1955, and plant area expanded from 1.8 million sq. ft. to 7.2 million during the same period.

► **R&D Cutback**—McDonnell reports that its research and development work under military contracts has been cut by "several million dollars." He points out that, while its backlog stands at \$496 million, government authorized only \$360 million to be spent at McDonnell.



McDONNELL FACTORY in St. Louis is nearing completion of a \$10-million expansion that has increased space 5 million sq. ft.

This is an indication that McDonnell has some volume of letters of intent that have not been converted into firm contracts.

► **Denson Production**—McDonnell is nearing the end of its heavy production scheduled to end in the fall with the delivery of the 100th version of the design to the Navy.

Total of 29 Phantom and Navy signal now are operating various versions of the Phantom.

Final production version is the F-3H being built in a photo-reconnaissance and night fighter version.

The Phantom is scheduled to be superseded by the F-3H Phantom II, with production on the model extended through 1957.

For the Air Force, McDonnell is producing the F-101A Voodoo, a long-range penetration fighter, and a bombing version of the F-101A, a photo-reconnaissance version of the Air Force's jet fighter.

Production orders for both these planes are expected to be substantial.

► **Copter Projects**—In the helicopter field, the company has three major contracts pending.

- **XH-35** development for the Army and Air Force.
- **XH-35A** cargo copter for the Navy.
- **XH-35B** assault transport for the Marines.

The Guided Missile Division is continuing its expansion, but no details are offered on specific projects in McDonnell's plant.

► **\$17,999,824 Expansion**—The company is nearing completion of a \$17,999,824 facilities expansion program spurred by the Korean war.

A \$3.6-million hangar and a \$1-million propulsion laboratory were completed during fiscal 1955, and a \$1-million



NAVY TAKES DELIVERY of last Phantom model at Lambert Municipal Airport plant.



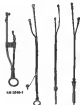
NEW LOW-SPEED WINDTUNNEL scheduled for completion by McDonnell this year.

LEWIS

Thermocouples

**Iron-Constantan
Copper-Constantan
Chromel-Alumel**

FOR MEASURING
TEMPERATURES IN AIRCRAFT



AN3540-1 AN3541-1 AN3542-1

AN3540-1 18 MM iron-constantan sparkplug-probe type thermocouple for measuring cylinder-head temperatures. Also available in compensation unit in 14 MM size for other models.

AN3541-1 Iron-Constantan Sparkplug-probe type with copper ring for 18 MM plugs. Wire guard and supporting bracket are stainless steel and products are protected with flexible heat-resistant sheathing. AN3542-1 terminals are also available for leads.

AN3541-1 Iron-Constantan Tap-mount Type thermocouple with junction located in silver tip. Sheath used with this thermocouple will retain its strength despite high temperatures.

AN3542-1 Chromel-Alumel Tail-pipe Thermocouple. Installed with a temperature-sensing antenna and overbracketed with stainless steel wire, this thermocouple is built to withstand severe air engine service. We can design an engine compensation measuring system.

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ENGINEERING CO.**
*Manufacturers of Complete Temperature
Measuring Systems for Aircraft*
HARTFORD, CONNECTICUT

McDonnell's Climb

	1940	1951	1952	1953
Sales	\$79,619,163	\$66,622,014	\$81,743,586	\$178,510,447
Earnings after taxes	\$1,815,119	\$3,291,262	\$5,066,145	\$4,214,181
Earnings per common share after taxes and preferred dividends*	\$4.33	\$4.52	\$4.49	\$5.58
Ratio of earnings after taxes to sales	2.28%	4.94%	5.75%	3.12%
Book value per common share	\$11.27	\$15.96	\$19.79	\$24.39
Backing	\$43,693,201	\$29,636,137	\$315,488,517	\$496,943,873
Preferred	5,560	5,225	11,218	51,815
Payoff	\$21,187,443	\$27,458,060	\$40,336,245	\$62,536,676
Price per share	6,181,311	1,796,135	1,631,643	2,028,510

*Adjusted retroactively for 3-for-1 stock split on Dec. 5, 1953

iron-tipped windshield is scheduled for completion in December. McDonnell also constructed 54.1 million in its share of the 56-o-ducton

improvement program to sustain the reign of the University of Southern California's cooperative windshield to include transverse and stress speeds.



J. EDGAR DAVIS made of Borac's plastic compound an eleven by eighteen Kenneth Davis (right) and had made Kenneth's house, who helped derive method of forming dies

Plastic Cuts Die Forming Time

Substantial production savings are resulting from use of a new plastic compound developed at Borac Plastics Co.'s Seattle plant. The material, particularly useful in the construction of purple dies, takes the name Duralene from two die-forming production men who compounded it—tool engineer Kenneth Davis and plastic tooling foreman Jack Lewis.

► **The Time, Forming**—Compared to an average time of 250 hr. to liberate a production die from steel, two dies

made from the new plastic required 80 and 96 hr., respectively. Also, the plastic may be worked more rapidly than steel, by filing.

► **Characteristics**—The new material, which has a base of Epoxyc resin, is used to bond to metal, wood, glass, fiberglass and many other materials without pressure or heat. The liquid plastic hardens in about 8 hr. and reaches full strength



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The energy in a single gallon of aviation fuel will move a one-engine jetter 250,000 miles by air, based upon the performance of a typical mail-carrying transport.

It's a fact, too—

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SHELL OIL COMPANY

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38 Hours Saved on a 40 Hour Job

Testing nearly two miles of wiring circuits in the Skyweeper Fire Control System formerly took 40 hours of a technician's costly time. Now a wiring machine, operated by a trained girl, does the job in just 2 hours—20 times faster and over 2000% cheaper!

AC's Know-How has developed many such short cuts to speed production and reduce cost of complex electro-mechanical devices like the Skyweeper's Fire Control System, the A-1A Bombing Navigational Computer and "A" Series Gyro-Computing Gun-Boat-Rocket Sights. For dependable defense production—on or ahead of schedule—at assembly line savings—the record proves you can always count on AC!



In February, 1953—only 18 months after orders were placed—AC delivered their first production T-38 Fire Control System for the Skyweeper.



AC SPARK PLUG DIVISION



GENERAL MOTORS CORPORATION

AC CORP.



NEW PLASTIC is used to wire drill jig in 48 hr. at normal room temperature or twice rapidly at higher temperature.

It has a compression strength with wet yield of 36,000 psi, while glass strength on a sample contact bond is 3,250 psi, it is reported. Harsco has already an interest in temperatures from below zero to above 1000°. The formula may be used to gun hardness, shear strength and other characteristics.

Other Uses—In addition to its use in jigging dies, Doring is using the material to set drill bearings. In fitting a 1.625 in. dia. drill jig to meet engineering changes, the old bearings are drilled out, leaving accurate holes. New bushings are placed on pins in the drill pin, the drill jig placed over it in the

required position, and the plastic pressed around the bearing. When the external function, the drill jig is lifted off and ready for use.

The plastic also is being used to set template brackets, make split-pin templates, and cast master gages.

SAE Forum Stresses Production Economy

Los Angeles—Annual aircraft production losses of the Society of Automotive Engineers opened at the Hotel Statler with discussions devoted to obtaining greater air power per tin dollar.

U S and foreign engineers gathered for standards and joint talks on such topics as quality control, plant layout, procurement, tooling, materials handling and manufacturing costs in aircraft production.

Forum periodical issued sources of SAE's 4-day National Aeronautics meeting.

Technical papers submitted at these sessions took up basic design, production and operation of aircraft flying faster than sound at 70,000 ft. and operating in extremes of heat and cold.

A classified session discussed new developments in carrier landing techniques.



Model 400



Model 400, No. 2



Model 400



Model 400



CAA-Certificated Helicopters under 400 h.p. have

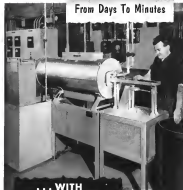


AIRCOOLED MOTORS, INC. SYRACUSE, N. Y.

TITANIUM DROP

These titanium alloy propellers Model-100 are being used in great quantities in new and old aircraft. They are produced by special Air Force research project, propellers designed by United Aircraft Corp.'s Hamilton Standard Division. Material is Titanium Metal Corp.'s Ti-6Al-4V.

Hardening Time Cut From Days To Minutes



... WITH
**HEVI DUTY
SHAKER HEARTH
FURNACE**

Master Lock Company

STEELS PRODUCTION WITH THIS NEW FURNACE

Heat treating of an 80 pound batch of steel springs required two days when hardening in charcoal filled containers. This process was not only slow but also costly due to a high percentage of rejects.

Now in a Hevi Duty Shaker Hearth Furnace, a similar batch is "bright" hardened in 75 minutes. Each spring receives uniform heat treatment without distortion thus cutting production costs. This furnace has been designed to solve your problems of heat treating small parts.

HEVI DUTY.

Learn more about this modern production tool and the way it can help you.
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HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 7, WISCONSIN
Heat Treating Furnaces... Electrically Exclusive
Dry Type Transformers Constant Current Regulators

Canadair Installs Noise Silencers

Two noise abatement units are being installed at Canadair, Ltd., Montreal. One of the installations is for tuning turbojet engines before they are hooked to airplanes. The remaining noise killing facilities—attached to pure air materials drop of 55 db—will handle engine tests with the powerplant installed in the plane.

Overall cost is figured at \$4-million. The facilities should be complete by the end of the year.

Canadair is producing two jet aircraft under license—the F-86 Sabre with Aero Canada's Gyrodyne powerplant and the T-33 two-seat trainer powered by a Rolls Royce Nova.

Because of the difference in height between the tailfins of the two aircraft, Canadair engineers designed a ramp for the T-33 so it is at the same height as the Sabre.

New Forging Die Facilities

A new die shop has been completed by Consolidated Industries, Inc., West Chester, Conn., to complement the recent field's improvements for close work, steel and aluminum forgings.

Dedicated entirely to special die job



POLISHING GUN

A simple finishing scheme at Consolidated Valley Aircraft Corp.'s San Diego division is cutting production costs by more than \$4,000 annually. A small, circular piece of emery paper is held against the metal part by the rotating action of a cylindrical section of rubber at the end of the air tool shaft. Finishing formerly was done by hand, polishing small parts with emery paper over a wood block. New scheme cuts only seven 3,600 lb. manually, but gives higher quality finish, makes it easier to get at hard-to-reach spots, Corvair says.

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... for its history making,
new DC-7's!



MN-52

American's new DC-7 flagship cruises at 365 miles an hour. Her top speed is 410.

Four turbo-compound engines, producing 13,000 horsepower at take off, will fly her coast-to-coast non-stop in eight hours... three hours less than today's fastest schedules. She's quite an aircraft.

And every step of her way, this newest of all ships will be guided by the ever dependable Bendix Radio Compass... the standard navigational aid to aircraft all over the world.

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Military S-55 Copters Roll Down Line At Sikorsky



SIX OF A KIND Flight of HRS helicopters, Marine Corps version of Sikorsky's S-55, line up after takeoff from aircraft carrier.



MAIN CABIN JIG with large bar and aft bar's heads in place. Main bulkhead built up the seven-cylinder Wright R1550 engine, which is installed at an angle in rapidly shutoff main section.



TAIL BOOM assemble area at Sikorsky hangs together 10190s and 10045s, US4F and Navy versions of the S-55. Top of boom carries series of U-bolts and a tunnel fitting for aft torque motor drive shaft.

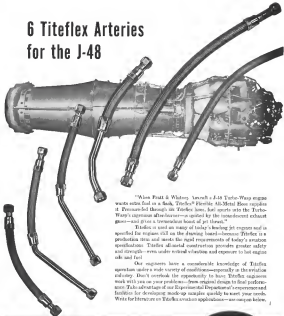


CABIN UNDERBODY usually shows deep longitudinal frame and series of main beams with deflector rails between. Underbody box in center of structure will accommodate gas tank.



FINISHING TOUCHES will take the Marine ready line. Air Force H-190s fit the use of the assembly line. The S-55 is designed to carry 30-35 passengers.

6 Titeflex Arteries for the J-48



"When Pratt & Whitney developed a J-48 Turbo-Wasp engine, waste gases had to be ducted. Titeflex® Flexible All-Metal Bore supplies it. Pressurized through six Titeflex lines, hot gases enter the Turbo-Wasp's exhaust afterburner—exhausted by the turbocharged exhaust gases—and give a tremendous boost of jet thrust."

Titeflex is used on many of today's leading jet engines and is specified for engines still on the drawing board—because Titeflex is a production item and meets the rigid requirements of today's aviation specifications. Titeflex's advanced construction provides greater safety and strength—even under normal vibration and exposure to hot engine oils and fuel.

Our engineers have a considerable knowledge of Titeflex operation under a wide variety of conditions—especially in the aviation industry. Don't overlook the opportunity to have Titeflex engineers work with you on your problems—from original design to final performance. Take advantage of our Experimental Department's experience and facilities for developing made-up samples quickly to meet your needs. Write for literature on Titeflex aviation applications—see page on below.

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MODEL 47 HELICOPTERS by BELL Aircraft CORPORATION



VIBRATION CONTROL MOUNTINGS

by LORD



Lord Mountings
on the upper engine bracket

Nearly every day the valuable services of military and commercial helicopters make newspaper headlines. But one contributing factor never meets the eye... the continuous efforts of Design Engineers to improve helicopter performance. For example, the Model 47 Bell Helicopter. Its smooth power delivery and control characteristics are improved by the Lord Mountings used as standard equipment on the upper engine bracket and lower engine bracket in these close-up photos. Combining the experience of Lord Engineers with that of airplane and engine designers results in the more nearly perfect and economical operation of military and commercial aircraft. In like manner the machines of business and industry are improved. You are invited to consult with us as to the control of vibration and shock to improve the operation of your product.

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Headquarters for
VIBRATION CONTROL

ing because at 1945 and proceeded on board on a heading of 234 degrees. A standard DDT approach was immediately begun. A few minutes past 10 and during the approach the aircraft began picking up ice, scuttling the propeller and windshield frames and the windshield wipers were tossed on. A normal approach was made and the aircraft became steadily smaller approximately one mile southwest of the airport at an altitude of about 400 feet above the ground.

The company's agent, who from the ground was maintaining the approach, advised the flight that he had it to sight and that there was no other traffic.

Because the tribulation showed the way to be from the southwest and easily aligned with Runway 25, the captain made a right and then a left turn to make a closer approach to this runway. When starting back out for the landing a few feet above the ground the company's chief dispatcher noted on the jump seat between and to the rear of the two pilots' seats momentarily showed as aircraft approaching from the left. He immediately alerted to the captain to look out. Power was applied at once, but almost instantly thereafter the two aircraft collided.

The DC-3 yanked to the right and for a few seconds was difficult to control, however, the right main landing gear wheel made contact with Runway 25, came to a stop from the collision point and the aircraft rolled off the runway onto the grass. After rolling approximately 500 feet, the captain was able to return the aircraft to the runway and stop. All occupants immediately disembarked, there was no fire.

On Dec. 14, 1952, Mr. Shannon, 57 years, manager of the Hinkley Air Center, aircraft Co., departed Wichita, Kan., for Detroit, Mich., in a Cessna 170 aircraft, N 1111B. Although no flight plan was filed it is known that sometime that day Mr. Cessna stopped at Alton, Ill., where the aircraft was scheduled. The flight was delayed at this point for a few hours because of unfavorable weather conditions, however, later in the afternoon, flight was resumed at St. Charles, Mo., where an overnight stop was made.

The following morning, Dec. 15, the Cessna pilot departed Springfield, again without filing a flight plan, and at 0729 when five miles east of Springfield, called the Vandalia, Ill., communications station reporting the Indianapolis and Detroit weather. The DC-3 weather sequence was given as follows: Indianapolis—rising, scattered 1,300 feet broken, 2,000 overcast, visibility 7 miles, temperature 24, dew point 25, wind west 14 miles per hour; Detroit—rising, scattered 1,000 overcast, visibility 10 miles, temperature 22, dew point 20, wind west-southwest 15 miles

Special authorization from the Administrator of Civil Aeronautics is required for anyone to use the "DDT" facility as a means of making an instrument approach to an uncontrolled airport if the instrument approach procedure is not published in the Pilot's Information Manual. Later General Aviation was the only party authorized to make such an approach at Richmond, Ind. The company's pilot, as mentioned at Richmond, Ind., called the first and was with difficulty. The Richmond Municipal Airport does not have a control tower and no tower.

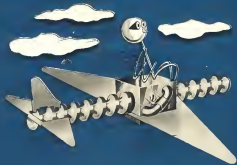
(Pilot's a right plan was received.)



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But if you do, it's ready and waiting for you in the enormous spare parts department at Wilco's. Like 200,000 other spare parts, it's stocked for your convenience... and your assurance that...if you buy equipment from Wilco's today...you can service it for many years to come.

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FOR MECHANICAL ACTUATION SAGINAW BALL BEARING

SCREWS PROVIDE THE ULTIMATE IN EFFICIENT,

DEPENDABLE OPERATION Saginaw Ball Bearing Screws are tried and

proven as the most dependable method of actuating wing flaps, landing

gears, trim tabs, stabilizers, etc. in America's latest planes. Can be combined

with electrical, hydraulic or pneumatic units. Write for our Engineering

Date Book.

Saginaw STEERING GEAR DIVISION

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per hour. Mr. Gross was also told at this time that a later sequence report would be available to him in an or seven minutes. This was the last known contact with the Cosmos pilot.

At approximately 0930, the Cosmos was observed approaching the airport down and from a southeasterly direction at an altitude between 300 and 400 feet and then to turn left for a landing on Runway 28. A few seconds later, at the intersection of the runway and Runway 35 the Cosmos and the DC-3 collided. The pilot and sole occupant of the Cosmos was killed and that aircraft was demolished by impact and fire.

INVESTIGATION

Examination of Runways 28 and 35 revealed a seven foot-long debris track made by the propeller of the Cosmos on Runway 28. This track ran located 40 feet southeast of the intersection of the run ways. The Cosmos came to rest in its vertical position on Runway 28, a distance of 245 feet from this propeller mark. On the right side of the runway near where the Cosmos stopped, a fuel tank was found which was identified as having made by the right landing wheel of the DC-3. No other marks on the runway could be identified as having been caused by this aircraft.

The main portion of the Cosmos wreckage was lying close together on the runway. The fuselage lay in an inverted position and was badly damaged by impact and fire. The right wing, which was damaged or lost impact by the right propeller and landing gear of the DC-3, was moved from the fuselage and demolished. The wingtip was in an upright position and had been severed from the fuselage by the right propeller and right landing gear of the DC-3, approximately two feet forward of the horizontal stabilizer. The left wing, although damaged to some extent, was intact and attached to the fuselage. A section of the Plexiglas windshield was found on the runway with a fracture of air on its outer surface.

The DC-3 suffered only minor damage, most of which was in the nature of nicks and slight abrasion to its propeller blades. There were a few scratches on the right landing gear strut. The left side of the right tire was cracked and there were a few shallow cuts both on the side of the tire and on the tread. A shallow indentation of air was found on the leading edge of both wings and the horizontal stabilizer.

Examination of the wreckage of the Cosmos and the marks on the DC-3 also showed that at the time of the impact the aircraft were on a steep climb at an angle of about 10 degrees with the Cosmos to the left of the DC-3. (Runways 28 and 35 intersect at an angle of 10 degrees.)

There was no evidence that either aircraft was malfunctioning prior to the accident. On the morning of Dec. 15, 1952, there was a low pressure center southeast of Boston Bay, Canada, with a weak trough extending southward across Michigan, Indiana, and into southern Kentucky. This trough was accompanied by low ceilings and light precipitation (raining from time to time) in flying clouds) in eastern Indiana and Ohio. By 0630, precipitation had stopped in western Indiana, ceilings had improved and it was clearing in Illinois. These were

no fronts in the area and the low clouds and precipitation were caused by very weak mid-level convergence plus a gradual up slope wind. The entire system was moving eastward.

Further details was not reported by the weather observer at Richmond and, therefore, no forecasts of flying clouds for that station were made. However, the weather forecasts at Indianapolis stated that pilots who were based at the Weather Bureau Office on the morning of Dec. 15, were cautioned against flying outward in an aircraft not having deicing equipment. At 0920 a weather report was made at Richmond which contained light drizzle and a surface temperature of 24 degrees. With that temperature it is obvious that "flying drizzle" should have been reported instead of "drizzle."

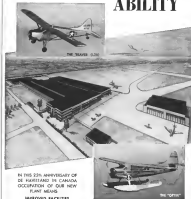
As far as is known, Pilot Gross made no report his weather information other than that which was given him shortly after departing from Ellettsburg. However, similar information was available to him pilot through scheduled broadcasts (transmitted every 15 and 30 minutes after the hour although none of these broadcasts is devoted to flying drizzle at the Richmond area).

Lake Central Airlines' station agents at Richmond are accredited U. S. Weather

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PLUS

ABILITY



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(INCORPORATED IN CANADA)
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AERO INSTRUMENT CO.

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Manufacturers of electrically heated aircraft parts
since 1925

Business hours and on such days without observation. These are furnished at any other month in the Indianapolis weather office.

The DC-3 crew testified that during the approach to the airport it was necessary to use windshield wipers, windshield de-icers and propeller de-icers and that after contact was established windshield de-icing fluid was burned off. However, a report is contradictory of this as the windshields made it necessary to immediately turn the de-icing fluid on again. They said also that the rain-eroded of the cockpit side windows were covered with a heavy frost and that together with shelled ice they obscured their vision approximately 25%. Both pilots said that throughout the entire approach they were in the dark for other aircraft.

The Kalamazoo Municipal Airport has three land approach runways: runway in length from 4,600 to 5,700 feet. The distance from the approach end of Runways 21 and 25 to their intersection is approximately 750 feet. Lake Central Airlines' office is in the Kalamazoo Building, which is located on the west side of the airport and faces in an easterly direction. A view from the nose of the office encompasses the approach end of Runways 21 and 25.

The Kalamazoo Airlines agent stated that he was the only company employee on duty at the time Flight 71 was making its approach, and that after referring to the flight sheet, he told them of its approach to be westward and ahead on the same approach, roughly 15 to 20 feet in front and to the left of the Kalamazoo Building. From the vantage point, he watched the DC-3 break through the clouds and proceed in a generally southerly direction. He then returned to the office and told the flight it was in sight and that there was no other traffic. Following this conversation he again returned to the tower and observed that the DC-3 was first on the downward leg of the traffic pattern and no other traffic being in sight, he returned to the office to perform other duties. A short time later he glanced through the office window and saw the DC-3 cross Runway 21, between the boundary of the airport and the intersection of the runways. Suddenly he saw the Cessna about to land on Runway 21. He notified the co-pilot to advise Flight 71 of the presence of the small aircraft. However, calls were answered before the message could be transmitted.

According to the company's Operations Manual, the agent is authorized to use a 40 ft. microphone extension (located on the end of the building during the morning of the flight in the local area). This was not done (Reference p. 50).

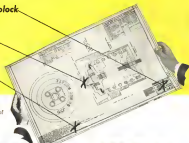
A member of ground personnel at or near the airport stated that they saw the DC-3 approaching the airport at a low altitude from the southwest. A short time later they observed the Cessna approaching approximately from the same direction and at about the same altitude at possibly lower.

Two passengers on board the DC-3, who were seated on the left side, stated that when the Cessna was near the approach end of Runway 21 they saw the Cessna at a lower altitude coming left to land on Runway 25.

Mr. Gurne, the Cessna pilot, had been employed by the Cessna Aircraft Co. since

All these changes made without one line of retracing

- substitute new title block here
- transfer design to cloth
- delete shop notes and lot numbers



The American Car and Foundry Company, at its Milford, Pa., plant, has to modify hundreds of drawings like the one shown here to meet Army Transportation Corps requirements. Retracing would be such a time-consuming operation that few else can do the job but Kodak's Kodagraph Autographic Materials see the welcome change!



First—a positive photographic reproduction is made without a camera—just by exposing the original paper drawing on Kodagraph Autographic Paper. A just enough light exposure (providing of exposure is a standard photographic surface) and processing to standard photographic conditions. The A.C. title block and shop notes are removed (not of the product) only the corrected design remains.



Next—the Autographic output of the design data is produced under a Kodagraph Autographic Press which is a mechanical device containing only the Army Transportation Corps title block. Then this composite is reproduced on a sheet of Kodagraph Autographic Paper. The same simple operation as in a good quality for positive of Kodagraph Autographic Paper and Film.



Result—a sparkling extra-detailed reproduction comparable to an ink on cloth tracing. And the job done—cost on the drawing board—but almost worthless in the great making machine. Additional time and dollars are saved by using Kodagraph Autographic Materials to produce positive and negative, and print a great lot of all kinds, drawings.

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LETTERS

Dialogue on Statistics

I've just had a very distressing experience a few minutes ago, a very old friend of mine burst into my office, bearing your Aug. 3 issue, but later a disquieting note of bronze from you. A shaking forefinger pointed toward your lead editorial, "Six Years Safe."

"You are dead!" he quivered. "You realize what this means—that I'll be killed the next time I take a scheduled airline coast-to-coast!"

Intentional statistical displays of this kind always indicate one thing: demonstrative is a regrettable lack of discipline. I mentioned my parables.

"Relax, you old fool!" I told him. "That's only to check if anybody reads the editorial page. And what else has you so much about, anyway? You haven't been riding a horse-cumulated trip every week for 2,000 years. I was, of course, so far from home. I am both dead and undetermined Statistics, and I know that figure don't lie. With a lead of five, natural counting, he said my word."

"But then figure," he quivered, "like the guy who told me when I started flying that it would be 500 years before I had an engine failure, if I was dead. I've had five, so that makes me 2,500 years old, weekly unaccompanied trip or an unduly massive cumulated trip. On top of that, I have 400,000 proved airline passengers who smile my bested test beds, and 1,500 hours of my own. No lead would give me even money on a scheduled trip around the corner."

Sometimes, I manage to keep my tongue, I even produced a promising scale. "Trouble with you is," I told him through my teeth, "you sit in on average percentage as an average point. You're a statistic, and I know it such a good friend of yours, I'd love you more in the US American Airlines Corporation. About I'll reply."

"Thanks," I went on lighting the wrong end of my life-size pipe again. "The tobacco certainly got laid on off you at the airport safety, like Colonial Super Airline. I suppose to know they've been visited. How was home for me, and modern transportation device like helped me of Nature's home functions."

"Your brother-in-law to live faster a party reference, and I remember once before when you and that three might be something in this house of Absolute Safety and that Absolute V. It's ought to make a smile of it."

"You were suggested that it might be a good idea (a smile always true, but) I none of the airline had a Vice President in charge of safety."

"My advice is this—and I must sincerely hope you take time to lay off that stuff, it's Wrong Thinking. Don't try to ruin someone, there is only the infinite approach back yourself to replace the Statistical World of Fairable Deeds. Ready for you there's no hidden acceptance in the office, yet."

"The poor watch really is concerned, and I feel sorry for him. I took my foot down off the desk and pointed him to the door. It couldn't help him, as I closed it firmly (and I hope permanently) behind him, leaving him to his fate."



Hydroelectric Spheremotor

A chain of flexibly coupled, hollow rubber spheres loop over drive pulley and through an inlet T chamber. On downstroke and up T chamber. From water and is returned to through opposite. Depending on flow, it can be used as a pump or a motor. It is, which way does it go?

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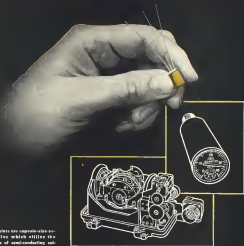
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*Transistors are capsule-size assemblies which utilize the physics of semiconductor solids to produce the same effects as an electronic tube...but without cathode and/or filament and their circuit components.

When ?

ONCE in a generation or more, there appears on the horizon an engineering accomplishment that becomes the object of wide discussion, enthusiastic comment and a great many predictions.

Such is the case with transistors today. Anticipating Honeywell leadership, many aeronautical men have asked when our company will be introducing "transistorized" control.

Long before transistors started receiving public notice, Honeywell research groups in the Aeronautical Division and the Flight Controls Division in Minneapolis and the Industrial Division in Philadelphia were experimenting with transistors. Honeywell engineers looked research with an avowed interest in power losses with Bell Telephone Laboratories, the pioneer of transistors.

Remarkable results have already come out

of this progress. Today, we are proud to report the development and pilot line manufacture of transistors with sufficient power to operate control motors and to pull in relays heretofore sealed transistors that should have infinite life.

Yet, even with our extensive research and development programs, much work remains. Such problems as temperature and circuitry must be further explored before transistors can be incorporated into production-line equipment. Even with concentrated effort, thorough engineering takes time—and it's worth time.

Honeywell aeronautical controls using transistors will be on the market at an early date as far as possible, but only after they have met airborne requirements and have been proved to be worthy of our slogan—"There is Controls." It won't be today. But, it will be soon.

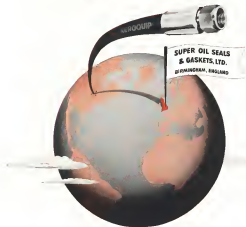
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Seals and Gaskets, Ltd., Birmingham, England, was licensed to manufacture Aeroquip Hose and Fittings. Thus, Aeroquip, the world's leading producer of hose lines for aircraft and industrial applications, has found new friends and important new markets.

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Davares, "Sage" Kikab—see below; Yarnock, CS-14, Deputy Chief Aviation Safety, replaced Kikab—see below; Tugala, GS-13, Supervisory Project Engineer, replaced Davares, CS-13, Supervisory Project Engineer, replaced Williams, Lynch, G-11, Service Representative, replaced Haggitt.

The whole picture is what "Haggitt" by the good old Hawaii "Vanguardian" which took place some time ago. For example, W. A. Kikab, Chief of the Aircraft Division in Seattle, was transferred to Los Angeles to replace James Adams, Chief of the Aircraft Division in Los Angeles, when Adams was called to active duty at Norton Air Force Base in San Bernardino. Subsequently, Haggitt's title has been changed to a brand new position, Chief of Aviation Safety for Kikab and transferred the old Aircraft Division into the present Aircraft Engineering Branch. Note, however, that no matter how aggressive and able were experienced the engine and related events at the same high (CS-14, CS-13) level.

Latest development is that Kikab was bumped by his own desire. Yarnock was brought from Seattle to take the deputy's place, and Kikab has been transferred to Washington to take Oscar Wyllie's old job. Inspector of the Boeing, the newly created CS-14 position of Chief and Deputy Chief of Aviation Safety are still occupied by someone.

No matter how the whole story is "taken" by organizational changes and all these time revisions, the important fact is that, when the CS-14 and five CS-17s (one, Col. J. K. Dancy is still at Wright Field) were actually adequate when there were left for active duty there are now three CS-17s and even GS-13s doing even better the same work.

Outstanding highlights are these:

1. Two of the newly created CS-14 positions, Chief and Deputy Chief of Aviation Safety, were brought in by what will assume the names of "Haggitt's Policy." These high paid positions are positions the CAA had the Aviation industry got along just fine without used. Even got to building for engine.

2. The position of Deputy Chief of the Aircraft Division (now Deputy Chief of the Aircraft Engineering Branch) left still at the same grade and salary are created by Charles Haggitt, only in 1951. No one occupied that position for almost two years had left the industry (excepted, along with Charles returned to it a couple of months ago). If there has been a real deficiency for the last two years or Charles went he was busy—like your job.

3. Back when the ones left the L.A. office for Wright Field the Service Representative, a man who was clearly noted for that particular job and who had performed it to everyone's satisfaction for some time or five years, was removed from the Service Representative position and assigned to the Lockheed position beyond his own mind because "reports of obtaining a CS-13 position at Service Rep. was not." (Presumably, because of getting a GS-13 at the Lockheed Project Engineer was pretty good). Today, the immediate Service Representative is a CS-12. Why? Simply because he was one of the ones who was "left over" when

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Reveals the presence of liquid in a sealed container without the need of a relay or a warning signal. It can be mounted in any direction.

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the Air Force have been back to work. He is the company's top engineer in the Research Division and will be in charge of the project. (The Service Rep also represents the Flight Engineering Branch.)

4. There is still at least one Super Six Aircraft Engineer holding a GS 13 position open because he can't make up his mind whether he wants to return to USAF or make a move of the Air Force. A Colonel has the right to return to his old position as Supervising Project Engineer. GS 13 is an equivalent position and may be made up for him to do so. He has been leaving USAF, waiting to see whether he will be asked for old job and, if so, what.

CNA Engineer
Los Angeles, California

Godfrey Supercharger

With reference to the article on "The Devil" in last on page 49 of your Sept issue, we note the following information:

"With the new glasses will come many new experiences—Volkswagens, color superchargers and supercharger carburetors, besides fuel injection pumps."

The statement would seem that all of ICA's new aircraft will have Volkswagen color superchargers. But, when we last saw the Super Continental aircraft will tell us the contrary.

The Vienna News will have Godfrey's other superchargers. This option being proved to be extremely satisfactory in service with the North Sea fleet.

It would be very much appreciated if you would publish a correction on this point.

W. F. S. Coates, President
Godfrey Engineering Co., Ltd.
480 Metropolitan Blvd., London
Metropolitan St. County

Fast and Hot

The speed achieved by the Hunter as its model record (strongest 772 mph) compared to a Mach number of 1.98 approximately, assuming that the air temperature at the time was 70F. If the engine could have been used at the 772 mph, the Hunter would have been able to reach the 772 mph (a Mach number of 1.98) in the air. The Hunter was 15,000 ft. The speed would probably have been on the order of 740 mph (a Mach number of 1.91).

I have always suspected that American or British engineers to be better than the cold war, but investigating the Hunter's engine confirms to do so. England.

It is apparent that the Hunter is not confined. It is another proof of work we needed that the USA is God's Own Country.

W. C. J. Jackson
Apt. 6, 5721 Chandler Circle
Dallas, Tex.

Light Power Unit

We want to thank you very much for the note left with us on our 31-16 Standard Control Chart in American Wire, Sept. 18, but hope you will give us a correction.

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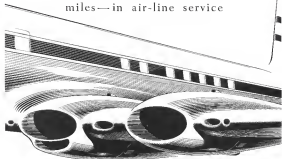
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only on a later date.
In the last paragraph you spoke of a
100 lb. gross and its supply 35 water.
I am afraid that people will wonder whether
progress is really being made in the ac-
countancy reduction? The weight of the net
is 55 lb.

A. W. DAVIS, Jr.
Aircraft Radio Corp.
Houston, Tex.

Praise

We would like to quote from *Airport*
Wires in regard to our article, "The Turbo
Compound's Transport Fuel Saver." We
want to include the report as it also lets us
"The Turbo Compound Story" which will
be used for distribution in world airline
conferences.

WILLIAM F. KASSA
Public Relations Representative
Curtis Wright Corp.
Ward Ridge, N. Y.

ARDC Issue

I read, via . . . , for the beautifully bound
edition of "The Air Research and Develop-
ment Commission."

I share with you your commendation for
the manuscript submitted at various centers
of the Commission whose publications and
work deserve the outstanding support
of all Americans.

THOMAS B. McKEOWN, Governor
State of Maryland

Generally, you are to be commended
upon getting rid of the publication.
It contains a great deal of information
which I think will be of real interest to
everyone interested in the work of the
Commission.

I wonder if it would be possible to secure
a extra copy for our Engineering School,
Lawrence Wright, Dean
University of French
College of Engineering,
Cantonville, Ill.

. . . You have just described one of the
important phases of an research and devel-
opment. Indeed, this phase is a tribute not
only to the progress being made in Amer-
ican air power but also to the engineering
genius which was its foundation. Your con-
tribution for American Wires.

LENN H. CAMPBELL, Jr. President
American Chemical Area
Washington, D. C.

The research and development activities
of our company have been very closely
aligned with the progress of the Air Research
and Development Commission. We have
found that special issue of *Airport* Wires
was helpful in summarizing in a very useful
manner the organization, personnel and
function of ARDC.

ROBERT L. GILBERT, Vice President and
General Manager, Hughes Aircraft Co.
Culver City, Calif.

I appreciate in such the copy of "The
Air Research and Development Commission"
edition of *Airport* Wires. I will pass
this in my office and look forward to refer-
ring to it.

WILLIAM THOMAS BERRY DOW, M. C.
House of Representatives
Washington, D. C.

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Designers and Manufacturers of Automatic Controls—Flap, Landing Gear, Cabin Heater, Fuel Transfer, Flow Indication, etc., and other types—Frigidaire, Bendix, etc., and also—Automatic and Manual Types—Fuel Transfer, etc., Section in also—Automatic—Single and Double.

WHAT'S NEW

New Publications

Recommended Practices for Spot Welding Aluminum and Aluminum Alloys, 14 pages, illustrated, has been issued by the American Welding Society as a design and manufacturing manual. Included is a table showing which combinations of aluminum alloys can and cannot be spot welded. Welding schedules are provided for frequency converter, resistance, resistor, electro magnetic and electrostatic spot welding and standard arc machines. Price is \$4.80, from American Welding Society, 11 W. 30th St., New York 16.

An index covering the 27 monographs of the Massachusetts Institute of Technology Radiation Laboratory has been published. The monographs detail the control features of the work of the MIT group, and include as a constant the status of technical developments in the field in laboratories throughout the world to the end of World War II. Published by McGraw-Hill Book Co., 120 W. 47th St., New York 36. Price is \$4.50.

Telling the Market

Soldering wire connections and other specialized electrical fittings are detailed in Catalog 57, issued by Buchanan Electrical Products Corp., Hahoe, N. J.

How to select, use and adjust tools for aircraft electrical connection installations is covered in illustrated instructional manual, distributed by Bendix King Wiring Co., Inc., Norwalk, Conn.

Splice gages, instructions and accessories price list covering 165 sizes and types of gages, is being distributed by Baldwin Lima Houston Corp., Philadelphia 42, Pa.

Introduction to Fluorocarbon Meter compares fluorocarbon variable-area types and variable-head types. Distributed by Parker & Penn Co., Chicago, Pa.

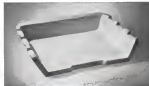
Use of beryllium copper to solve design problems is covered in booklet, Applications Unlimited, offered by the Beryllia Corp., Reading, Pa.

Working equipment line of Miller Electric Mfg. Co., Appleton, Wis., is detailed in catalog of new SR devices, with flow magnetic amplifier principle.

Aircraft electrical system ranging from 1/20 hp to 50 hp are illustrated in Bulletin B55. Volume two discussed

THE CONNECTING JUNCTION—critical focusing point of all the elaborate electronic equipment of Lockheed's Navy PSV sub-buster—is protected by a "Bareless" junction box" produced by Omehandro.

Whether it is for strength to protect against fragmentation, or precision plus speed of production, the aircraft industry has learned to depend on the Omehandro "O" that means reliability. For specific information, address Paul Omehandro Co., Box 890 Paramount, Calif. • TOrrey 7-8217



C. P. Wiggan Co., Southern Representative, Box 100, Grand Prairie, Tex.



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Flex-O-Tube has also been used in field work with flexible hoses for the field assembly of various types of lines and tubes.

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Manufacturing facilities are keyed to precise production control. This means you can depend on Flex-O-Tube delivery dates . . . and that's equally important when you're working against tight production schedules.

Every needed inspection and testing facility is on hand at Flex-O-Tube to safeguard the high quality standards of every product shipped. You can depend on Flex-O-Tube performance.

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FLEX-O-TUBE

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models are described. Water U.S. Electrical Motors, Inc., P.O. Box 2658, Turners Avenue, Los Angeles 54, Calif.

Gable channels, rails and forming and bending machines recently developed by Standard Products Co. are described in bulletins available from the company, 2130 W. 11th St., Cleveland 3, Ohio.

Physical properties and processes and finishing procedures for bending Torlonite bearings from alloy are described in Publication B-19 being distributed by American Brass Co., Waterbury 26, Conn.

Cut rubber blade production is covered in 17 min., 16-mm sound movie available on loan from Ultra Drop Forge & Tool Corp., Ultra 6, N. Y., care of Henry Zieferting.

Lowering production and maintenance costs by hard facing application of hard alloy metal to a low alloy steel base, is described in a booklet available from Cleveland Hard Facing, Inc., 1047 Stillman Ave., Cleveland 5, Ohio.

Coating slabs by using surface-active elements is covered in booklet distributed by Tanno Products, Inc., Terminal Avenue 2548, Los Angeles, Calif.

Magnesium alloy and castings handbook provides considerable background on methods used and facilities being offered by Hilti McGowan Co., Tumbler Div., 3625 N. Western Ave., Chicago 18, Ill.

Forging facilities for titanium, aluminum and alloy steels available to the aircraft industry are covered in brochure issued by Consolidated Industries, Inc., Mastic Rd., W. Chatham, Conn.

Optical benches, including letter-type, double- and single-end and accessories, are covered in Bulletin 456-13 distributed by Gossamer Scientific Corp., 1201 W. North Ave., Chicago 14.

Metallic used for aircraft use is discussed in a new booklet, Elastic and Thermal Properties of Reaching Aircraft, available from Jela A. Roebbing's Sons Corp., Trenton 1, N. J.

Machine speed changes in variable and fixed ratio machines are covered in Technical Data Sheet M-1, available on request to Melcor Instrument Co., 432 Lincoln St., Denver 3, Colo.

Incalculable losses with mechanical drive clutches are illustrated and described in Catalog, 588, issued by Norgin Machine & Tool Works, 537-597 Northland Ave., Buffalo 11, N. Y.

Industrial fire protection hose is described in bulletin available from W. M. Taylor, advertising manager, Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Talcott & Conly Sts., Philadelphia 24.

Will the product you plan to make...

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an alloy so tough you may not yet have heard of it?

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a forged finish like plate glass?

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a man-made inferno?



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IS MORE THAN
SKIN DEEP...**



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PRESSURE SWITCHES FOR ROCKERS, JET ENGINE AND AIRFRAME APPLICATIONS • PRESSURE GAUGES
THERMOCOUPLES • HYDRAULIC VALVES • JET ENGINE AFTERBURNER CONTROL SYSTEMS



Dielectric solder use, together with complete product descriptions, are subjects of EC-1118 PC bulletins being distributed by Massachusetts Mining & Mfg. Co., Adirondack & Castings Division, 427 Poplar Ave., Detroit 2, Mich.

Yardstick charts for plotting heavy component and loads are detailed in bulletins being distributed by the author, Yacht-Site Shelter Co., Detroit 1, Mich.

Working with H-Stream, fourth edition, contains drawings, including riveting and gun spacing equipment, access considerations, additional riveting limits, methods and illustrations for the turbine. Available from H-Stream Kevlar Tool Co. 8024 Billings Ave., Los Angeles 45, Calif.

Packaged adjustable-voltage drives for variable speed applications are covered in booklet 6 0105 being issued by Westinghouse Electric Corp., Box 3999, Pittsburgh 30, Pa.

Block loss and failures are detailed in booklet available from Cleveland Branch, Inc., 3951 East 20th St., Cleveland 21, Ohio.

Tyre change for use on the production line are detailed in bulletin issued by Aer. Welding Accessories Division, Peco Products, Inc. 2076 E. 63rd Place, Cleveland 3, Ohio.

Instrument bulb loadings are covered in catalog ABR which also deals with their classification, design and mounting requirements. New Document Division, General Motors Corp., Detroit 2, Mich.

The Creative Approach to Better Wiring is booklet presenting a planned wiring program for products. It is available from Aircraft Material Products, Inc., 3100 Fulton St., Hamburg 76.

Publications Received

• **Introduction To Aircraft Mounted Detectors** by Herbert Rauscher, pub. by John Wiley & Sons, Inc., 460 Fourth Ave., New York 16, N. Y. \$12.50. Book to give the student a broader and deeper knowledge in dynamical principles than had been needed in the past.

• **Ultra High Frequency Propagation** by Hasso R. Kroll and Carl M. Roroff, issued by W. W. Weaver and J. W. Ploesser, pub. by John Wiley & Sons, Inc., 460 Fourth Avenue, New York 16, N. Y. \$9.50. This work makes available the most recent information on new developments in the field of ultra high frequency radio wave propagation.

• **Modern British Aeroplanes** by Charles Gardner, pub. by Temple Press Limited, Basingstoke, Great Britain, London E. C. 1, 51 50. The author explains in language clear and understood by the average pilot the size and structure of the many new designs now seen in British skies.

ALOFT with the LEADERS



**The Piper PA-23 APACHE*

In the category of personal aircraft, there is no name better known than Piper. Leading the trend in this field toward faster, safer, roomier planes is the new twin-engine Piper PA-23 "APACHE". For this sleek ship—practical for night flying under instrument control—Electrol engineers integrated their technical skill with that of Piper designers to build the necessary hydraulic components. This same coordinated effort is at the disposal of all aircraft manufacturers.



FLIGHTS • BRIDGES • VALVES • PUMPS OF VARIOUS
CAPACITIES • GEAR DRIVES • BARGE PUMPS
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VALVES • SHUTT VALVES • SHUTT VALVES • SHUTT

Better Designed Products Use Electrol Hydraulics

Automatic Plants: From Powder To Product

The method is at hand to satisfy industry's past and growing appetite for avianic components.

Answer to this riddle is the nation's first "automatic factory" for mechanized production of electronic parts (Automatic Wire Sept. 25 p. 17). Starting at one end with raw materials, the factory, was actually new techniques to grow out at the other end a stream of electronic modules consisting of a tube and associated resistors, capacitors and wiring.

Wafers and Ink-Called Project Technicians, the process combines use of printed-circuit techniques with wafer bonding blocks that are assembled into modules for specific purposes.

The ceramic wafers, seven-eighths of an inch square, are stamped and pressed from a mixture of talc, kaolin and barium carbonate at the rate of 1,500 an hour.

Complete availability of the water-immersion parts is done in a single machine. See sidebar.

(Continued on page 74)

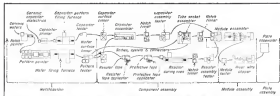
TINKERTOY MODULE combines tube with secondary circuit components that have been assembled and wired in automatic machines. These modules may well be the atomic and electronic building blocks of the future.



1. CERAMIC WAFERS less than an inch square (see on left) are stamped and ground here at rate of 2,500 an hour. Many fine, very exact, machines are also needed.



2. CIRCULAR SORTER



FLOW SHEET

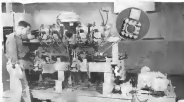
shows layout of Timberley pilot plant that converts raw materials into finished modules. Plant is owned by Kvaerner Electronics Div. of Wabco Motors, Canada; is 1,000 modules an hour.



3. PRINTER sharpprint srs 82 has simultaneous with repeated pattern of emulations which cannot be used without. After emulations are over, which are not automatic text



4. TAPE RESISTORS



S. CAPACITORS are loaded in this machine by automatically soldering and printed capacitors onto the conducting surfaces on the body wafers. Up to two capacitors, ranging from 7 micro-microfarads to 400 microfarads, may be attached to each side of the large wafers.



6. TESTING An automatic test chosen is guided by pre-defined directions (see next). Tables for proper resource allocation are page 74

FIND OUT HOW THIS NEW



GETS GOING... SAVE TIME
General Cutter Head...
...saves time...
...saves time...
...saves time...



7. MODULE ASSEMBLY

and non-printed components such as resistors, capacitors, etc. are soldered to the module. The module is then tested and assembled into the rack.

As the module is assembled, the wires are soldered to the module. The module is then tested and assembled into the rack.

The rack gives the part rigidity and provides the electrical paths. By using the rack, any given point between two wires, that particular path is eliminated.

The module assembly may be joined with or without an electrical connection, as between copper plates in which contacts have been etched to make a complete electronic circuit. Several such plate assemblies may be combined to form an entire component.

Procedures are used for automatic inspection of every stage of production.



8. MODULE GROUPING

is to make a complete component or major assembly by soldering a variety of loose modules with the printed circuit or by soldering and then soldering to base modules. The modules are then tested and assembled into the rack.



take place in the machine, where time is not wasted, such as soldering, etc. The module is then tested and assembled into the rack.

The conventional electronic circuit diagram is then used to determine the necessary production planning and an MDE worksheet. The diagram is then used to determine the necessary production planning and an MDE worksheet.

The worksheet is used to make items for the manufacturing machine, to establish inspection points and procedures, to indicate what quantity of raw materials must be used, the cost and value of the system that must be produced, etc.

► **Preproduction Message**—The program for preproduction production of electronic equipment—MDE—was developed by Baker as an industrial production program. It is used in the production of electronic equipment that would be used in an aircraft or in a military or naval application.

Tulacore, the first of MDE, was



To keep pace with the rapid development of flight, higher performance aircraft, General Electric engineers have developed...

New G-E Flight Control System Designed For Tomorrow's Aircraft

The new General Electric FCS Flight Control System was developed to meet the stability and flight control requirements of advanced planes which will roll off production lines beginning in 1965.

The FCS represents new engineering concepts beyond the currently successful G-E systems now installed in the Navy's Chance-Vought F4U-3 Corsair, Douglas F4D-3 Skyraider, Grumman F9F-8F Super Corsair and Grumman F9F-8F Super Corsair and the McDonnell F4H Phantom.

CAN BE CUSTOM-DESIGNED
The FCS is a fundamental system concept which can be custom-designed from a family of integrated components. The number of components, and in some cases their actual design, can be varied to suit specific applications.

Designed to perform a wide range of functions, the FCS can fulfill the reliability base requirements of a single axis, dual axis or the many requirements of a fully automatic relief and

measuring system including stabilization in all three axes.

RELIABLE AND LIGHTWEIGHT
Reliability and lightweight are only two of the FCS's design features. It will also incorporate 1) automatic pitch trim 2) "G" limiting in automatic modes of operation to prevent overstrain of the aircraft during maneuvers 3) continuous synchronization of autopilot during manual maneuvers 4) immediate pilot take over at any time—through the stick and rudder pedals—with no transient in the system. The FCS also has been designed to operate in conjunction with heading, fire control, navigation and ground control systems.

FCS BULLETIN AVAILABLE
The FCS is another in the long line of G-E products engineered by the men who know the needs of the aviation industry. If you would like more information on the FCS system, write for bulletin GEA-6039 Section 210-84, General Electric Company, Schenectady, N. Y.



ENGINEERING SPECIALISTS at G-E work in a team constantly improving present equipment and solving future system plans.



RESEARCH FACILITIES include both analog and digital computers for complete analysis of the performance of aircraft and their components.



FLIGHT TESTING at G-E's Flight Test Center, Schenectady, N. Y., tests new developments almost with regularity in high-performance planes.



G-E AUTOPILOTS are now in operation in the Navy's first plane and are being installed in new aircraft. McDonnell F4H Phantom.

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PRECISION
DROP FORGINGS
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Weber "Glide-It" doors are in one section of the all buffet, offer sliding doors for both seats are of highly polished walnut, tastefully styled to match the decor of the cabin. A durable, stainless steel working surface adds to sanitary cleanliness and convenience. As illustrated, the buffet can be closed when not in use.



Why not find out how Weber's buffet will work with you in your airplane equipment problems? Telephone or write today.

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by **WEBER**



WEBER AIRCRAFT CORPORATION

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developed by the National Bureau of Standards with the aid of several industrial contractors.

The pilot plant is operated for Navy by Kase Electronics Division of Wilbur Motors. Kase Electronics started design in January 1951 at Detroit. In September 1952, the machines were transferred to an NBS facility in Arlington, Va. By May 1953, machine modification and repair had been virtually completed and Kase awarded Kase Electronics the contract for pilot production.

► **Engineering Applications—**Radco Associates, Inc., Norham, N. H., has been awarded the task of designing and producing major engineering applications of Tolerator. Rudolph C. Sander, Jr., expects the machine to be made applicable to virtually all electronic equipment, including radar and television. Among the electronic equipment engineered by Sander for the new technique are a submarine detection device (now in the pilot plant) production line to produce narrow ribbed tubes, a radio altimeter and a radar control system.

A number of other companies are listed in the working out of Project Tolerator. Douglas Corp. of Ann Arbor, Elliott City, Md., made a number of special machines. Communications Measurements Laboratories, Inc., Plainfield, N. J., provided specially designed automatic production test equipment. Davis Laboratories, Riverside, Md., and Monro's Tool Graduate School, Monterey, Calif., also took part in some phases of the work.

Tolerator's sponsors believe that MPE has shown the way to a 70% reduction in final time of finished electronic equipment.



SMALL SET

Miniature antenna system developed and produced by North American Aviation's Division (Caldwell) plant for use in its new T-28B trainer in addition to NAA's growing activity in the aviation field. Interview provides for communication between cockpit as well as reflecting for an accurate course and navigation signals.

is this your timing problem?



Sorry! A. W. Haydon Company Can't Help Your Timing Here.

Only a "pro" and practice can straighten you out!

But — — —

We are the "pro's" for precision timing. Come to us with those timing problems. You'll find that we have solved more complex A.C. and D.C. timing problems than just about anybody else. Maybe we have already solved yours. It costs you nothing to find out. Write for catalog.



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Extensive use of DOW MAGNESIUM sheet, extrusions, and sand castings saves many important pounds on this versatile aircraft



When you have to go straight up from a standing start, weight saving is of prime importance. That's why designers of helicopters are making extensive use of magnesium, the world's lightest structural metal.

The range and capacity of new current production model helicopter have been greatly increased by the use of magnesium. In this way the requirements of magnesium are equal to approximately 22% of the craft's total empty weight. This consists of 490 pounds of castings, comprising 96 different parts, and 700 pounds of sheet and extrusions, including nearly all of the fuselage skin.

The weight saved by the use of magnesium has helped increase the efficiency of helicopters. Where only yesterday these craft were aerobics, today they are the real work horses of our armed forces.

Whenever you have a weight problem, investigate magnesium. One third lighter than aluminum, magnesium offers you an exceptionally high strength/weight ratio. It is a practical metal, available in all common forms, suitable by all standard shop methods. For complete information, call your nearest Dow office or write to: Magnesium Department, THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on **DOW MAGNESIUM**



Makers Announce Avionics Components

A variety of new components suitable for application to avionics equipment have been recently announced. The new devices and their highlights are listed below:

- **Switching concentrator.** A multi-channel solid-state high-speed switching concentrator for use in telecommunications or rapid sampling circuits has been announced by C. M. Gorman & Co. Device weighs 1/4 oz. and is available with one or two poles and a maximum of 45 terminals on one pole, 15 terminals on the second pole. Concentrator has plug-in test-point construction and is available with either break before make or make before break type contacts. C. M. Gorman & Co., 117 E. Colorado St., P.O. Box N, Pasadena 1, Calif.
- **Terminal blocks.** Plastic terminal blocks are available with 40, 60, 80 or



108 pinholes double-ended terminal from Leadtek Electric Co., County Road, San Carlos, Calif.

- **Rectifier-suppressor.** This is a dual section rectifier for use with d.c. motor control from a c.e. supply. One section provides half-wave rectification for the motor operating unit, the other provides a path for the current resulting from the collapse of the magnetic field in the relay coil during the non-conducting half-cycle.

Device, identified as Type D-2960,



LESS SPACE!

**extra high
safety
factor!**

NEW (T-J) Spacemaker AIR CYLINDERS

These new T-J Cylinders save up to 40% in mounting space—with streamlined design that eliminates no rods. They're super rugged—extra high safety factor... solid steel heads... heavy wall, precision bored, hard chrome plated, stainless steel body. Leakproof cylinder head to body construction... heavy duty, bi-metallic, hard chrome plated piston rod.

Available with the new T-J Super Cushion Flexible Seals which insure positive contact with automatic valve action for fast return stroke. Many standard sizes and styles... for pushing, pulling, lifting, clamping or control jobs. T-J dependability. Write for bulletin 8132. The Tomkins-Johnson Co., Jackson, Mich.



CIRCULAR HEADS
WITH TIE RODS



SQUARE HEADS
WITH TIE RODS



SPACE
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T-J SPACEMAKER... provides additional room for adjacent equipment without sacrificing strength.

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is encapsulated in a thermosetting plastic and is rated at 18+ channels and 1 mV output at 100C, making it suitable for surgical use. Manufacturer is International Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif.

• **Pulse-forming network.** A new line of monostable pulse-forming networks, identified as the NC 14 series, is available from the National Capacitor Co. Typical network, built to a customer's specs, has pulse width of 0.5 microseconds at 70%, a rise time of 0.02 microseconds and a pulse repetition rate of 1,000/sec. Unit is rated at 5 kv d.c., 0.005 microfarads, 50 ohm impedance, and operates at temperatures up to 90C. Its dimensions are 1x1x1 in. Company address is 585 Washington St., Quincy, Mass.

• **IP transformers.** Single and double wound output monochoic-frequency transformers, for operation at frequencies of 50 kc. to 100 mc., are available in plastic encapsulated form for operation at temperatures of -50C to 150C and up to 100% humidity from Varigord Electronics Co., 1354 Motor Ave. Los Angeles 36, Calif.

• **888 Series.** New series of 888s feature a single-sideband (SSB) receiver for operation at 25 kc intermediate frequency, is available from Burrell & Co., 45 Warburton Ave., Yonkers, N. Y.

Sub-Min Cuts-Slope Restorer-Air Force is reportedly considering production procurement of the new Collins Radio AN/ARN-12, a sub-minimum version of the presently used AN/ARN-18 slide-slope restorer.

► **Transcendent Fuel Gauge**—Two of the nation's fuel gauge manufacturers, Messtechnik-Honeywell and Avco-Kreschotek, are developing units which use transistors in place of vacuum tubes. The MCH development is under Air Force contract and the first experimental unit should be ready for test within a year, according to an AF spokesman.

► **Hydraulics for Radio-North American Aviation** is investigating the possibility of using hydraulics in place of electric motors to position and rotate an airborne radar antenna.

★ **Magnetics Research-Indiana Steel Products Co.** has been awarded a contract for basic and applied research into magnetism by USAR's Air Research & Development Command. Program will include development of new magnetic theories, alloys, and design factors for magnetic circuits. □

—FPA



DISTANCE-dissolved!

THESE USAF GLOBAL POWERS are maintaining direct radio contact with their true back home--two continents away!

How is it accomplished? RCA's revolutionary new ARC-21 communications equipment — the most advanced of its kind in the world — enables them to make full use of favorable radio conditions as they change throughout the world.

Helping to solve radio communications problems is just one of the many ways RCA is assisting our Armed Forces to ensure U. S. supremacy in electronics. Be sure to get acquainted with the RCA engineers and Field Technicians in your branch of service.

You, too, can help our Armed Forces keep our country safe. The U.S. Air Force urgently needs men and women volunteers to spot many crucial—many Air Defense filter centers—do the many jobs as part of the Air Defense team. 750,000 potential Americans are among 300,000 more are needed.



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ENGINEERING PRODUCTS DEPARTMENT CAMDEN, N. J.

See what adhesives are doing today!



Keeping your power dry!

Protecting our shores from invasion is only one of the jobs assigned to Navy aircraft. Another task, equally important, is for the plane to protect itself against its own "natural" enemies.

For instance, consider the possible effects of salt air and water, of moisture condensation, of vibration on the electric wiring that delivers power throughout the plane. How quickly these elements would destroy the aircraft—if not checked.

To help protect these power lines, 3M, working with McDonnell engineers and the U.S. Navy, developed EOC-1128PC—a potting compound, not affected by vibration, that provides a permanent seal for wiring in plugs against moisture and salt air. It helps to keep your power dry!

See what adhesives can do for you...

Like to know more about EOC-1128PC... or other 3M products designed expressly for aircraft use? Then, by all means, call in your 3M salesman, or write in for your free copy of our 12-page aircraft booklet. Address your request to 3M, Dept. 1119, 411 Fiquette Ave., Detroit 2, Michigan.



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outer shield and ground (condenser effect). Recently new wrapping Lastic-type over the entire length of the lead, which gave good results.

• Mount taken. Rubber shock mounts supporting the ignition boxes (mounted in Zone No. 1) full order frequently as a result of high ambient temperature.

• Conclusion—Proving flights of the Comet started in March 1951. Engines were then equipped with the Lastic torch system. Starting fuel was piped to, separately via a solenoid shut-off valve and a reducing valve to a spark plug equipped by a booster coil. After the equipment's low-altitude night test was determined, high-energy ignition equipment was installed by May 1952.

Current ignition equipment for the Comet Mk. 50 includes two British Thomson-Houston high-energy (12 in. x 1 in.) Model C2751 and two Lodge water plugs (Type 2771B) at Nos. 5 and 7 combustion chambers.

Fuel is vented to specifications D.Eng. R.D.2482. Wide cut gaskets are not used.



Tester Evaluates Bearing Torque

A rapid-response torque tester for ball bearings, which companies break away, starting and running longer, and evaluates race roughness and dirt in gasketed bearings, is offered by Baker Co., Inc.

In the testing operation, one control enables the operator to raise the voltage on an eddy current system until it starts the bearing. At this point a reading on the meter gives comparative measure of starting torque, while a steady state running torque is indicated in reduced voltage.

On another meter, at a selected speed, amplified signals generated by race roughness and dirt indicate bearing quality.

Price of the unit is \$400-f.o.b. nearest factory. Availability is said to be 12 weeks.

Baker Co., Inc., Maplewood, Mo.

NEW AIRCRAFT SERVO COMPONENT



The Type 20-2 Servomotor is a compact, rugged unit for use in aircraft.

MECHANICALLY SEALED MECHANISM
The mechanism sealing and anti-friction parts are completely sealed in a stainless steel case. The servo motor is a compact unit, 2 1/2 in. x 1 1/2 in. x 1 1/2 in.

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A special high strength aluminum alloy housing with a built-in shock absorber and a built-in shock absorber.

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The Mylar tube is the heart of a modern beacon or carbon radar system. However, today's experimental aircraft and guided missiles reach altitudes as high as 50,000 feet, where air pressure drops off to a near-vacuum. Common problems increase permeation short circuits and possible flashover to develop at the Mylar's cathode and reflector connections. Humidity intensifies the problem, while the tube itself reaches surface temperatures as high as 150°C.

One way to maintain frequency stability is to encase the tube in a heavy and space-consuming pressure system Varion Associates, of Palo Alto, California, one of the world's largest manufacturers of klystrons, accomplishes the same effect by molding Silastic® around the connections and lead wires. Flexible, lightweight and no larger than the tube itself, the Silastic withstands high operating temperatures and mechanical abuse. Moisture in sealed out and corona trouble is entirely eliminated.

The remarkable resistance of Silastic to corona discharge is confirmed by severe laboratory tests. In one test, for instance, lengths of Son Silastic and organic rubber-covered ignition cables were coiled around glass rods and wrapped with copper screen. A full 14,000 volts was applied continuously between the screen and conductor. Within 30 minutes the organic cable broke down from corona cutting, as illustrated (near). The Silastic was still unaffected after 12,000 hours.

That's the kind of performance that makes Silastic, the Dow Corning silicone rubber, escape among rubbery materials. When you need excellent dielectric properties in a rubbery material that resists its resistance of temperatures as high as 500°F and as low as -130°F, specify Silastic.



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NEW AVIATION PRODUCTS



Generator Gives Jet Engines Variable-Voltage Power

Jet engines receive constant-current, variable-voltage electric power with a new motor generator set being offered by Motor Generator Corp., Helms Industrial Alliance.

Known as model 925 aircraft engine, the set is designed for jet engines equipped with variable voltage drive systems. Rated at 700 amp 25.5 v, d.c. continuously, set is also used to supply 700 amp for three vacuums or 1,000 amp for one variable current test duty.

Unit has a compound-wound type, direct current generator with interpole and separate (separate) excitation. On a common shaft is a 25 hp 210-440 v, three phase, 60 cycle, square wave induction motor operating at 1750 rpm. A variable tap between motor and generator controls and automatically with protective controls provided for both the aircraft and motor generator set. Motor Generator Corp., Robert Brothers Alliance, Robert Rd., Troy, Ohio.



Vacuum Gauge and Switch Make 5-Position Monitor

Shiping Instrument Co. announces that its vacuum gauge is now available with a switching unit which enables it to register as many as five positions in a vacuum system with the single gauge. One lead switching permits use of a



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When PERFORMANCE is of utmost importance specify KOHLER Precision Controls.

Shown is a fuel dump valve made for Westinghouse Electric Corporation for its new, powerful engine and in the McDonnell Navy F3H-2 Phantom aircraft. The valve's function is to release fuel from the fuel line, eliminating fire

hazard while the plane is landing. To insure top PERFORMANCE Kohler has facilities to test and analyze the chamber body and the chamber steel components, to finish, inspect, assemble and test the valve for shipment on the required date.

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single operator. Hastings states that they will permit processing plants or laboratories to economically establish permanent multiple point monitoring systems for measurements in the low pressure range.

The unit is said to be protected for widely separated indications because calibration is not affected by length of cable from indicator to gauge tubes. Continuous readings may be made without affecting pressure in system.

The gauge is protected from dust going, system contamination and corrosion by noble metal diaphragms and the use of nickel-plated gauge tubes. Calibration of gauge tubes reportedly is not affected by exposure to atmospheric pressure or change in ambient temperature.

Hastings Instrument Co., Inc., Hampton, Va.



New Accumulator's Seal Seals Better, Lasts Longer

Parker Aircraft Co. has come up with a new type of cylindrical hydraulic accumulator.

Designed for accurate calibration involving pressures up to 1,000 psi, the unit comes in both single- and double-shell construction. Parker reports that the design conforms to MS 25708, and that its wearability meet all requirements of MIL-A-5478, including gas-free and low temperature, gas-charge leakage test.

Accumulators are available in sizes ranging from 12½ in. overall, 24-in. cylinder and 15-lb. stroke (weight, 3.5 lb.) to 35½ in. overall, 4½ in. cylinder and 27½-lb. stroke (weight, 28.5 lb.). Normal total oil volumes range from 35 through 460 cu. in. (permissible).

The double-shell model of the new accumulator has a pressure-balanced inner cylinder. This makes possible long seal life, thin-walled cylinders and safe reaction to gas-free, Parker reports.

Pressure balancing is accomplished by providing an air space between the inner shell and outer cylinder, and access to the air side of the cylinder, so that an pressure can be applied equally on both sides of the cylinder wall. Normal air pressure in the air chamber is approximately one-third the working hydraulic pressure. This air seals the cylinder to maintain the exact

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Our new "Win Parts on Precision Forging" outlines UTICA's methods and facilities for precision forging, now timely engaged in jet blade production, but ultimately generally available.



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some diameter over its entire length without the "breathing" or distortion normally accompanying pressure changes. Parker can, eliminating a major cause of fatigue.

In the event of explosive shocks, such as gunfire, is the type of the accumulator, the compressible air "cushion" between the outer shell and inner cylinder reduces peak pressures. Double shell construction permits to contain release of air when outer shell is punctured, the compressive force out.

A further advantage latent for pressure balancing is that it also serves to alleviate the problem of heat reduction is smooth. The air space gives the double shell construction a considerably larger surface for heat dissipation.

The accumulator's piston is free floating. It rides on two O rings, one on each end of the piston, and does not contact the cylinder wall. The O rings, accomplished this by using AN standard O rings fitted into new type grooves.

Wearing vents and air caps are in top parts of the accumulator design. The wearing vents consist of drilled passages in the accumulator and caps which serve to warn of entering air or fluid pressure within the unit. For signs are arranged that when an end cap is partially removed, either air or fluid will escape through the passages of internal pressure have not been completely relieved.

End caps are forged and internally threaded, giving maximum strength. Being on the outside of the cylinder, they also give support to the outer walls in case of catastrophic shock pressure. Parker Armco Co., 5825 West Century Blvd., Los Angeles 45, Calif.

Portable Work Platform Is Erected Quickly

A new portable hydraulic platform developed by Scullid Equipment Co. can be erected from its eight components in 15 minutes. It is designed



Cut nut-running time

75%



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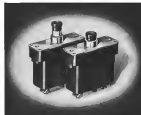
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KLIXON

to do any job within a fraction of an inch of the best design.

The manufacturer states that unit will hold up to 3,000 lb. over an 18 sq. ft. deck area. Construction is all steel, made from special carbon steel tubing (4 ft. on the unit consist of either a 3-1/2" or 5 ft. hydraulic arm, and a Power-Pak hand pump. It may be elevated at rate of 2 ft./min. and lowered within seconds.

Modality for the platform is provided by either 5 in. or 6 in. rubber for better lock center. Removable hand guard rolls are furnished for safety. As an added safety feature, Scofield has provided thumb screw safety locks on all legs to lock the platform at any level.

Units are available in three standard sizes: 34 ft. adjustable to 64 ft., 7 ft. adjustable to 12 ft., and 12 ft. adjustable to 17 ft.

Scofield Equipment Co., P.O. Box 5755, Pittsburgh 22, Pa.

ALSO ON THE MARKET

The thermostat will point power out carbon dioxide and radiant electric to members for and around spread of flame on the surface. It is applied by brush or spray on ceilings, hangars and public buildings. It reportedly has passed fire and specifications and U.S. Engineers' tests. Known as Py-Kote, paint has been listed by Underwriters Laboratories and carries Underwriters' label on can—Py-Kote Co. division of Morris Paint & Varnish Co., 27th & Douglas St., Omaha, Neb.

Non-hygroscopic film is offered to solve ten to thousands joining corrosion problems. Called Estericor from EPOK, it is said to lower surface tension, provide greatly improved wettability and completely eliminate corrosion caused by absorption of water from the atmosphere. Reportedly cleans the joint by removing surface oxides, acts as automatic leak indicator (peeling of film indicates approximate joining heat), and protects weather and driver flow of alloy—Esteric Welding Alloy Corp., 1731 St. & Northern Blvd., Flushing 35, N. Y.

Tempered steel drill for drilling hard-wood steel has three wide teeth to keep it from binding. Overcut holes are reportedly eliminated due to the greater bearing surface of the wide teeth. Heavy center section protects against drill breakage. According to the manufacturer, any standard drill press can be used in hand-drill with this unit by simply mounting drill in the chuck and adjusting the belt for proper speed—Tempered Steel Drill Co., 1619 Superior Ave., Cincinnati.



**Aircraft
Controls**

... chosen to maintain

cabin comfort in new DC-7

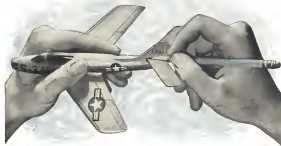
flagships of American Airlines

Cost-to-cost non-stop... in eight hours! That's the service American Airlines will soon inaugurate with its new fleet of DC-7 flagships. And every mile of the way between California and New York, American's DC-7 passengers will fly in complete air-conditioned pressurized comfort. To consistently provide the correct temperature for DC-7 passengers and crew, American again selects the Barber Colman automatic temperature control system, just as it has previously for their DC-6, DC-6B, and Constellation flagships. Helping develop this system to meet the needs of these new DC-7s is another example of how Barber Colman engineers team up with the industry's leaders to bring about ever finer service for the traveling public.



The Barber Colman line of aircraft controls includes: Actuators; Valves; Positioning Controls; Temperature Controls; Small Motors; Ultra-Sensitive Relays; Thermo-Sensitive Elements. Engineering sales offices in Los Angeles, Seattle, Chicago, Baltimore, New York, Montreal.

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Aeroproducts self-locking actuators . . . by providing instantaneous adjustment of variable surfaces to any position within their designed range . . . have eliminated many previous restrictions in aircraft design. Without pre-selection or positioning, these new actuators permit variable surfaces to be locked in position and held until changed by the pilot.

Any combination of systems—hydraulic, pneumatic, electric or manual—can serve as the primary power source. These actuators can be synchronized readily in tandem or in series to provide coordinated control of related movements.

Announced uses of Aeroproducts self-locking actuators include control of the "flying tail" of the new Republic F84F "Thunderstreak" jet fighter, the horizontal stabilizer on another high-speed jet fighter, and the afterburner of a jet engine. Additional applications include control of wing flaps, dive brakes, bomb bay or cargo doors, gun nozzles, variable wing sweep and incidence, wing fold and canopy slides.

FINANCIAL

Aviation Stock Option Plans

Year	Authorized Options on Outstanding Shares	Options Granted to the Plan	To Whom Granted	At What Price	On What Date
American Airlines	100,000	10,000	Officers	\$47.50	8-15-52
American Sul	50,000	5,000	Employees	\$12.50	1-15-53
Boeing	100,000	10,000	Officers	\$35	4-15-51
Boeing	50,000	5,000	Employees	\$35	4-15-51
Douglas	100,000	10,000	11 Officers	\$10.00	4-15-51
Eastern	100,000	10,000	Employees	\$10.00	10-7-50
Lockheed	10,000	1,000	Officers	\$10.00	11-30-50
Northwest	10,000	1,000	Officers	\$10.00	10-22-50
Northwest	100,000	10,000	Officers	\$20	4-15-51
Northwest	10,000	1,000	Officers	\$20	4-15-51
Northwest	10,000	1,000	Officers	\$20	4-15-51
Northwest	10,000	1,000	Employees	\$20	4-15-51

1. Source: Stock Option Plan for Employees, New York Stock Exchange.
2. The first year 1952 of stock option plan is shown in parentheses.
3. Based on authority in form of document.
4. Granting price on day when it is granted.

Options: For the Few or Many?

Airlines use them broadly, as general morale builders; manufacturers use them as incentives for top people.

Should stock option plans be used solely as a means of attaching and rewarding top levels of management, or should they be extended over a broader base as a general morale builder?

Both viewpoints are represented in a New York Stock Exchange comparison, in which airlines stock options prominently, of stock ownership plans.

Most of the plans are presented as options granted to top management, with limited exceptions to officers and key employees. However, in a number of airlines, especially in the air transport group, a broader base has been sought. This group has demonstrated a more progressive approach than the aircraft manufacturers, in attempting to make stock ownership plans available to wider segments among its employees.

► **Why Stock Options?** Most reports on stock option plans stem from the special tax treatment written into Revenue Act of 1939 passed by Congress.

This special tax provision permits officers to buy shares in their own companies under favorable circumstances in order to provide greater incentives to management. Because of heavy income taxes, even large salaries frequently fail to afford adequate net compensation, according to a number of officials.

Under the approved stock option plan, a device is available permitting option holders to acquire a considerable stake in their companies. As a

practical matter, these options are used to attract top talent and in such event subject to heavy personal income tax impact.

► **Qualifications.** To qualify for this special tax treatment, the option price must be at least 10% of the market at the time the option is granted. Other provisions stipulate that stock cannot be sold for at least two years after the option is granted and must be held for at least six months after the option is exercised in order to establish a capital gain.

The widespread use of the stock option plan throughout American industry is an indication of its acceptance as an integral element in corporate practice. The current New York Stock Exchange study reveals this trend in the majority of companies in diversified industries following the pattern set by its report previously compiled of various plans as disclosed by listing applications since 1950. The accompanying table lists aviation stock option plans. (A number of airlines companies have listed purchase programs and are not included in the table.)

► **For the Few.** It would appear that aircraft companies have been much quicker to grant stock options to management than the airlines. Also, a common characteristic of most aircraft option plans is to favor a few officials.

► **Douglas Aircraft Co.** offers an interesting

AVICA
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Fire resistant hot air lines are recommended because they will not fail under flame attack and render ineffective the fire extinguisher system by spilling a large volume of high pressure air onto the engine nacelle. 100% reliability is assured during the critical period before final fire extinguishment.

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Dept. 5, 12860 Shaker Boulevard Cleveland 20, Ohio

ing. The company's latest statement indicated that 33 officials would have. Actually, eight would not participate. The original round was set against 70,000 shares at \$100 per share. Following a five-hour stock split, these options were adjusted to a call on 50,000 shares at \$40.50 per share. The provision of Douglas Aircraft now holds options on 40,000 shares. At present market prices, his options show an uncorrelated appreciation of approximately \$750,000. This gain is by far the greatest for any individual among the plan vision.

• **Conner made available a profit-sharing plan to some of its executive officers on Jan. 28, 1950.** Most of these individuals have since left the company. They captured a call on 15,000 shares of stock at \$10.50 per share and were able to acquire this equity over a period of time through a stock purchase plan with no deductions to the company or the issue of new interest bearing notes. A later plan made 10,745 shares available, also at \$10.50.

• **Republic Aviation plan granted to top officers the right to purchase a total of 11,000 shares of its stock at an average price of \$8.7857 June 15, 1952.** At present market quotations a similar appreciation has accrued to the option holders.

• **Boulton Bus—The airlines have spread their options over a broader area.**

• **Boeing Air Lines was the first in the carrier to make options available to its employees under the Revenue Act of 1950.** It also showed the way in having a broad base for participating in the plan. Boeing's program made stock options available on 100,000 shares to all employees who had been in the service of the company for three years or longer. Options on about 55,000 shares were exercised by about 4,000 employees. No instructor including the president of the company, was permitted to participate in this particular plan. The purchase price was established at \$15.50 per share. Current quotations are about \$22.50 (share). Late last year, 28 of the stock, as optioned, was paid for and taken up by its subscribers. Payments were made through regular payroll deductions.

• **American Airlines also effected a broad distribution in its stock purchase program for employees.** Initially, a total of 250,000 shares were made available to officers at an option price of \$12.70 per share in September 1950. In June 1952, an additional 210,000 shares were offered under a share acquisition program for a much broader group of employees at \$12.50 per share.

• **United Air Lines recently launched a stock purchase plan for its employees.** Under this arrangement, all regular employees who have been in the service of the company one year or more are eligible to participate. Each employee elect

ing to acquire stock is United through this program will make payment through payroll deductions of not less than \$5.00 nor more than \$100.00 per month. To these payments, United will contribute 15% toward the stock purchase fund. The aggregate stock purchase deductions from employees can not exceed \$1,500,000 annually. The 15% contribution by United provides added encouragement to stock ownership by employees. Further, through group purchases, individual savings in commissions are effected and a wide range means of stock accumulation in the company by small investors is made possible. An integral element of this

plan and more like it is that it feeds into a sense of proprietorship which can prove to be an important morale booster.

• **All Aboard Bonair—in the past, criticism has frequently appeared as to the award of options on a two liberal basis and not of importance in view of the company officials in the success of the company involved.** On the whole, however, there is an increasing awareness that when equitable distributions are made and are applied within the confines of reasonableness, the stock option principle has led to progressive management action and has helped the stock holder.

—Selig Altschul



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1947 First "push-button" flight across the Atlantic by the USAF A2 Weather Flying Division Douglas C-14, with Sperry Gyrocompass and Automatic Approach Control, made trip both ways without take-offs and landings without human hands touching the controls.

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One of a series of sub-sonic aircraft demonstrating the Sperry Atlas course of Powered Flight.



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1932 First woman to fly the Atlantic solo was Amelia Earhart. Her Lockheed Vega was equipped with Sperry Gyro-Horizon and Directional Gyro and made the trip in 14 hours and 54 minutes.



1953 Air Force bombers, like the B-57, depend on Sperry Bombing Numerical Computer to compute their planned mission. Last year's round-the-world airman, Sperry navigation equipment helped 3 Lockheed Constellation transports to reach their destination safely. You'll find Sperry too in the cockpits of the long-range jet transports of the future.

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Staff Engineer ARMAMENT

We have an immediate opening for a staff engineer in the design of aircraft armament systems, armor, and their installations. Duties include responsibility for evaluation various aircraft armament systems, the preparation of basic armament design specifications and the technical direction and administration of armament design.

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PAL Boosts DC-3 Seating, Cuts Fares

Philippine Air Lines is enlarging their 25-seat DC-3s to have 40-passenger interiors that can be converted to combination transports carrying 32 persons plus freight.

FAL speakers say the new configuration will allow a 40% reduction in loss to domestic, international routes, paving the way for an increase in air cargo traffic.

► **First-Class Passengers**—Larger seating arrangements were trashed off by a comparative study made by the airline of its market, which gave these average weights for Fiberglas:

- Adult male, 143 lb
- Adult female, 132 lb
- Child, 45 lb

These light weights plus the Fib pen's relatively small frame structure made feasible FAL's plan to use 25-lb double Berna seats in a four across, 10-row layout.

► **First Commencement**—The carrier will test passenger reaction to the new interior when its three transports begin operation in the month (Dec. 1).

If the configuration is accepted, the carrier probably will change its entire 26-plane fleet of DC-8s to accommodate more constraints.

• **Quick Change**—The new layout calls for quick conversion (two manhours) of the basic vehicle to a passenger cargo plane by moving the two forward rows of seats.

Aluminum tubing structures supporting spools webbing will separate the DC F's freight loads from the passenger cabin.

Bolivia, Ecuador Bid For More Air Traffic

Two South American republics are constructing new airports and improving old fields to attract more international air traffic. The countries also are trying to build up their airline systems.

■ **Export Program**—Cemex is modernizing two airports at Quito and Guayaquil. Pedro Cerbo Medina, Minister of Public Works, has sent airport plans to the Export Import Bank for consideration and approval. Railways are to be extended and modernized and new buildings constructed at the old field.

In Bolivia, Indian farm laborers are building an airport near the town of Chica, which in good weather will be adequate to handle DC-3s. The strip is named for Walter Lujan, general manager of the United Amos Bolivianos.

At Copacabana, Bolivia aerial work has begun on another airstrip. For human work has started on an administrative building for the field.

► **Cannar Building**—The Argentine airline, Aerolineas Argentinas, has cancelled DC-4 survey flights from Santa Cruz, Bolivia, to Lima, Peru, to determine the possibilities of such a route.

The Bolivian government is studying a plan to export minerals and other raw materials needed in France in exchange for spare engines and aircraft parts. This probably is the first instance where international barter has been used to assist in maintaining a national airline.

LAR, the Bolivian airline, recently raised its schedules to include 1,400 flying hr a month, compared to 1,300 last year. During the same period, the airline increased its average utilization from 2.9 to 3.4 hr per day.

Lower Airline Profits Forecast for 1954

Airlines earnings next year probably will fall below the profits expected in 1977, Standard & Poor's, business advisory organization, forecasts from a current analysis.

"Absence of the abnormal stimulus of the Korean war points to an easing of standard-time traffic in 1954," the service says, "although further expansion of discourse service will at least provide much expansion."

Operating margins after depreciation apparently will continue to narrow because of rising depreciation charges and other costs. Standard & Poor's concludes, and the account narrowing of profit margins so far shows no sign of change.

Contributing factors are expenses of new plant integration still to be incurred by many utilities and the scheduled sharp rise in deregulation.

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Peak performance for every plane stopping at Stuttgart is the goal of Mr. Berry and his crew. That's why Euro Aviation Products are used exclusively.

DEPENDABLE ESSO AVIATION PRODUCTS offer high quality, backed by constant research and development at one of America's largest and finest petroleum laboratories.



TAIL-TOE CAMERAS

Canes that look United? In Latin America, the 'World is a Walk-Off' campaign, a launch into the leading edge of USL, DCMG's initiative. Unusual scenes and panoramic shots were sought for the series' promotional 16-mm color motion pictures, just released in United. Filming the Great Kofu Spout in El Miraflores, who produced the motion picture for United with the DCMG, was a challenge. USL requires Kofu to film for 24 hours. The camera operator in the photo of left, Miraflores, who spent the more conventional half-mounted camera rig while McGee sports a night that depicts film covered by the Can-Kofu. The Hollywood motion picture producer (as the DCMG's producer during filming of USL) uses movie and the lighter as a guide while he directed from the hill of California. McGee, who is the only person in the world, the transport's small bus of California, by bringing the camera through on electronic service from the DCMG's support.



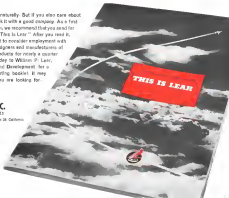


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You want a good job, naturally. But if you also care about your future, you will seek it with a good company. As a first step in the right direction, we recommend that you send for a copy of the booklet, "This Is Lear." After you read it, we believe you will want to consider employment with Lear, Incorporated—judgments and manufacturing of quality aerospace products for nearly a century. Write today to William P. Lear, Director of Research and Development, for a free copy of this interesting booklet. It may be just the "break" you are looking for.



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(Sept. 25/Oct. 4)

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Airline News Service Plans Expansion

News Service, Inc., publisher of the airline industry's largest news service, plans to expand its coverage to include all airlines operating in the United States.

The company, which was founded in 1946, has a long history of providing timely and accurate news to the airline industry.

The company's expansion program will include the addition of new reporters and editors, as well as the development of new services.

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Pointed in the small United States. Air News Service is owned by International News Service. In addition to daily news releases, the papers can appear in the case of news selected by the editors.

Service has information on the state of the industry. He describes "The Air News" which was started two years ago, as the first daily news service newspaper ever printed in the United States.

CAB Charges Atlas Diverted NEA Profits

Civil Aeronautics Board's decision last week has charged North American Aviation Corp., North American and Consolidated Value Aircraft Corp. with diverting profits from the sale of aircraft.

Atlas, which controls Northwest and Boeing, controlled by Boeing, made \$215,000 profit on the sale of three Boeing 707s. CAB still sees a loss.

Under Board rules and law, they charge, the deal should have been cleared through CAB.

If it had been, a Board official says, the alleged \$215,000 profit might have been used to offset Northwest's losses.

The airline originally ordered the planes from Boeing Northwest sold them, at cost, to Atlas Subsidary Aircraft, Inc., which on the same day sold them to Atlas at \$215,000 each.

CAB charges that, it is alleged, Atlas



HANDS-OFF LANDING

U.S. aviation executives discuss the airline's new route. From left to right: Hugh L. Dryden, director of the National Aeronautics and Space Administration, T. P. Wright, president of General Aeronautical Laboratory, Westwood, is still senior vice president of Boeing Aircraft Co., St. Paul, Minn.; Fredrick B. Smith, president of Spence Composites Co., and E. B. Richardson, senior vice president of General Dynamics Corp.

to be standing in front of the bomber's wing. Left to right: Hugh L. Dryden, director of the National Aeronautics and Space Administration, T. P. Wright, president of General Aeronautical Laboratory, Westwood, is still senior vice president of Boeing Aircraft Co., St. Paul, Minn.; Fredrick B. Smith, president of Spence Composites Co., and E. B. Richardson, senior vice president of General Dynamics Corp.

REPORT TO OUR ADVERTISERS . . .

Eight months of progress climaxed by the biggest issue and the biggest month in AVIATION WEEK history . . . a record 427.57 advertising pages for August 1953.

AVIATION WEEK believes that its advertisers—an audience that continues to grow substantially with each passing month—are due a progress report on their favorite magazine. In August, AVIATION WEEK compiled an all-time publishing record . . . a 454 page issue on August 17th . . . and the advertising total for the month was the biggest in Aeronautical publishing history. The August advertising figure, 427.57 pages, as well as AVIATION WEEK's eight months 1953 total of 2,344 advertising pages represents more space than the combined total of the next three Aviation publications. With this whopping total AVIATION WEEK for the second year heads for that select group of young and old pros comprising the 25 largest consumer and business magazines in the nation. Headsy stuff!

This solid achievement of AVIATION WEEK is further spelled out by its uninterrupted progress to record industry acceptance and advertising volume, a fact convincingly illustrated by its yearly advertising figures: 1950—1,680.92 pages, 1951—2,541.35 pages, 1952—3,242.67 pages, 1953—2,425 estimated pages. With volume such as this, it becomes futile to speak of rate of growth comparisons. From 50 to 100 pages monthly represents a 100% gain, but the net result is something less than substantial in terms of industry potential. In publishing perspective, a gain from 225 to 250 advertising pages a month—a 7.7% gain—which on first inspection does not sound so impressive, is far more to be desired. Experienced buyers of magazine advertising space happily are in the know on this point as far as Aviation space is concerned. They pay little, if any attention, to such percentage comparisons. Long ago they marked them as deceptive and unreliable unless such claims were advanced where equal or near equal advertising volume was involved. In the Aeronautical field the advertising leadership of AVIATION WEEK has been unchallenged and uninterrupted for many years . . . year after year this publication has published more than the combined total of the next three publications.

Advertising figures such as these, however, tell only a partial story of AVIATION WEEK

progress. Along with them go the expansion of our editorial services, with a staff now numbering 19 full-time editors, skilled Engineering and News specialists recognized throughout the industry. In the last eight months, in addition to their regular AVIATION WEEK writings, products of their talent have appeared in the SATURDAY EVENING POST, READERS DIGEST, HARPERS Magazine and on Major National Television Channels. Their achievements are ones in which we take considerable pride. They are an indication of the caliber of our staff. Supplementing their services are eight domestic News Bureaus, the services of Press, Inc., subsidiary of the Associated Press, Inc., foreign news offices in London, Paris, Frankfurt, Manila, Mexico City, Sao Paulo and Tokyo, and correspondents in the principal cities of the world.

This heavy concentration of editorial talent and resources has resulted in the building of a reader preference unique in the business publication field. It is a record that has been exhaustively tested by the industry itself through their own reader preference studies. Of twenty-seven conducted through engineering and management departments, customer lists and directories AVIATION WEEK has won them all—and not closely but by a better than 4 to 1 average. It is our standing offer to any manufacturer to conduct his own reader preference study, if he wants to get at the facts of reader preference and magazine pulling power. We'll gladly pick up the check, if he desires. This record of reader preference has stood for years, increasing in momentum, and explains why when orders and inquiries of merit are wanted, AVIATION WEEK is always first at bat.

Our growing audience of AVIATION WEEK paid subscribers (\$6.00 per year) continues to rise significantly. There are 10,000 more on the books since last year, making up a current total of over 45,000 not paid subscribers, (42,743, 6/30/53 ABC statement). Likewise our book value rises importantly as indicated by our all-time high renewal percentage.

These facts and figures should serve in some small measure to make clear AVIATION WEEK's position among the powerful, independent publications of today. They are furnished to you with a deep sense of gratification because through you we were able to achieve them.

AVIATION WEEK
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Putting a Squeeze on Industry

In its effort to hold down the national debt, the Bush administration is slowing down progress payments to aircraft and other war contractors. The shifting of financing to industry, unless accompanied by other modifications, may add to aircraft costs as well as interfere with production.

While some delays may occur in progress payments on current contracts, financial observers expect the real impact to be felt when new orders are awarded and full financial commitments must be anticipated by the prime contractors.

This attempt to transfer financing responsibility is considerable in itself, and is in keeping with a policy that aircraft builders should accept in not seeking any pre-ordered treatment, it is pointed out. However, the aircraft industry is in a poor position to finance any replacement funds for progress payments unless the Defense Dept. removes such restrictions as the new law allowing interest charges as a proper pricing element in contract costs.

"These changes appear to be a cost of doing business—the same as for all other industries who do not ordinarily deal with the government—a second set of ground rules will prevail which will permit aircraft firms to compete more effectively and tolerate their lack of production awards," one industry observer told *Aviation Week*. "Unless corrective action of this type is effected, serious repercussions may take place in the aircraft industry."

Any prime builder, knowing it has to do its own financing without proper reimbursement, is likely to cut down on inventory. This will mean less forward ordering, more rejections and subcontractors, which, in turn, will reduce business volume all along the line and make for short scheduling and limited forward planning. Employment curves may be seriously affected in the process.

All that lack of stability will simply add to the cost structure of the industry and most ultimately be absorbed by the government in one form or another.

Strange Case of the Errant MiG

The back-tracking and double-talk on why we don't keep that \$100,000 prize of all aviation prizes—a whole double Russian-built MiG-15, in perfect shape—which dropped out of the sky to our air base near Seoul the other day reminds us of the kind of diplomatic glibness dogged us were hardly so much of when Mr. Acheson was Secretary of State and Assistant President.

As proper as all this diplomatic consideration of the Communists may be in striped-pipe circles, it leaves a lot of Americans cold, as included. Because we don't want to be reminded that there is only one potential enemy of our kind of world. Who knows how many lives will be at stake if our analysis is based exclusively on any important reports in Russia's, in event of war? Yet, we have offered the MiG back to its "owners," the

biggest Russian prize we ever had in our possession. Even if the possibly clever intent is true—that neither North Korea, China, nor Russia may dare to subordinate such ownership, we must hold the MiG study for a quick return. This will make it impossible for us to put it through the exhaustive flight and static test necessary for us to learn the most about it.

Foeling a running high in *For Air Force* circles: "Neither propaganda nor diplomatic chicanery will compensate for the failure to obtain complete, verified performance data in the Communist's latest aircraft." *Aviation Week's* For East correspondent, Bill Jenson, adds from Tokyo:

"The Defense Secretary's order strained authorities here in the Far East Command, as well as in the Far East Air Forces. Gen. Mack Clark, FEAC commander, who made the original \$100,000 offer for a MiG-15, was walked, to say the least.

"For a long time," Jenson adds, "it has been no secret that USAF wanted a whole, flyable MiG. Air officers commiserated cordially when Denmark returned MiGs in which Polish planes fell from behind the Iron Curtain, although they recognized that the Danes' action was in accord with accepted practice in foreign relations between two countries not at war.

"But the North Korean MiG case over under different circumstances, for which there were no closely established customs. Even if diplomacy eventually might debate the advisability of returning the plane, it was a point of entry upon for argument.

"Our pilots say they never could judge how consistently good or bad the MiG was. So much depends upon the pilot. Most Communist pilots (those under training) lacked the skill, the will or the freedom of action to exploit fully the airplane they were flying. The MiG is believed to be much better than its low rate in combat with the Sabers reveals. Wouldn't it be well to know what the MiG could do with the world's best pilots at the controls?"

Jenson reminds us that the Russians made no move to return 3-25 that landed on Japanese air during World War II—when the Soviet was not ally! Instead, they copied the Superfort and produced the TU-4, which now threatens our security. Does any American doubt that the Reds today would swap any new American plane, inspect it and fly it, and return it only if and when they were ready?

There should be ways to satisfy the high-policy international legal and diplomatic experts (whom Russia has indicated and seemed to often)—and still permit us to learn all we can about the MiG, because the Red fighter is exceedingly valuable to us, and Air Force Secretary Tamm's unfortunate comment at a press conference that it isn't worth much anyway since "it was a couple of years old" does not change this fact. We wonder if the Secretary is holding only himself or the American people.

—Robert H. Wood

Leadership in fuel metering...

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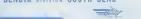
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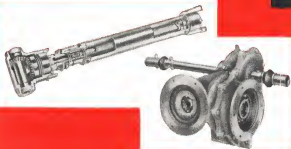
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